

The Mining Journal

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LONDON, FEBRUARY 25, 1955

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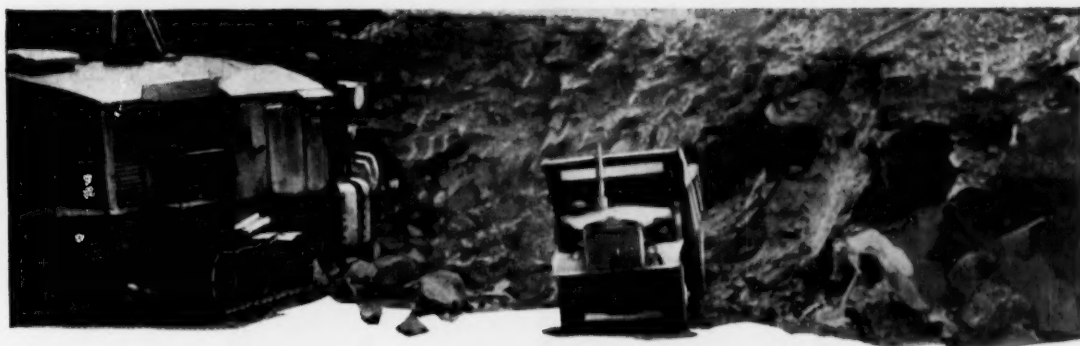
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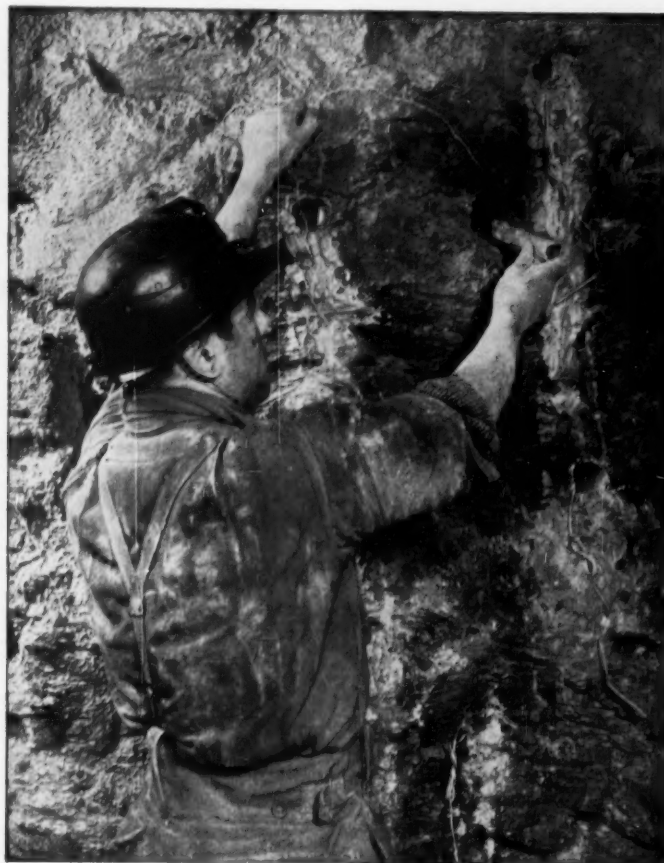


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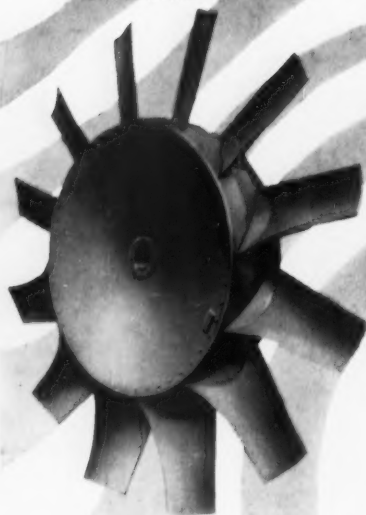
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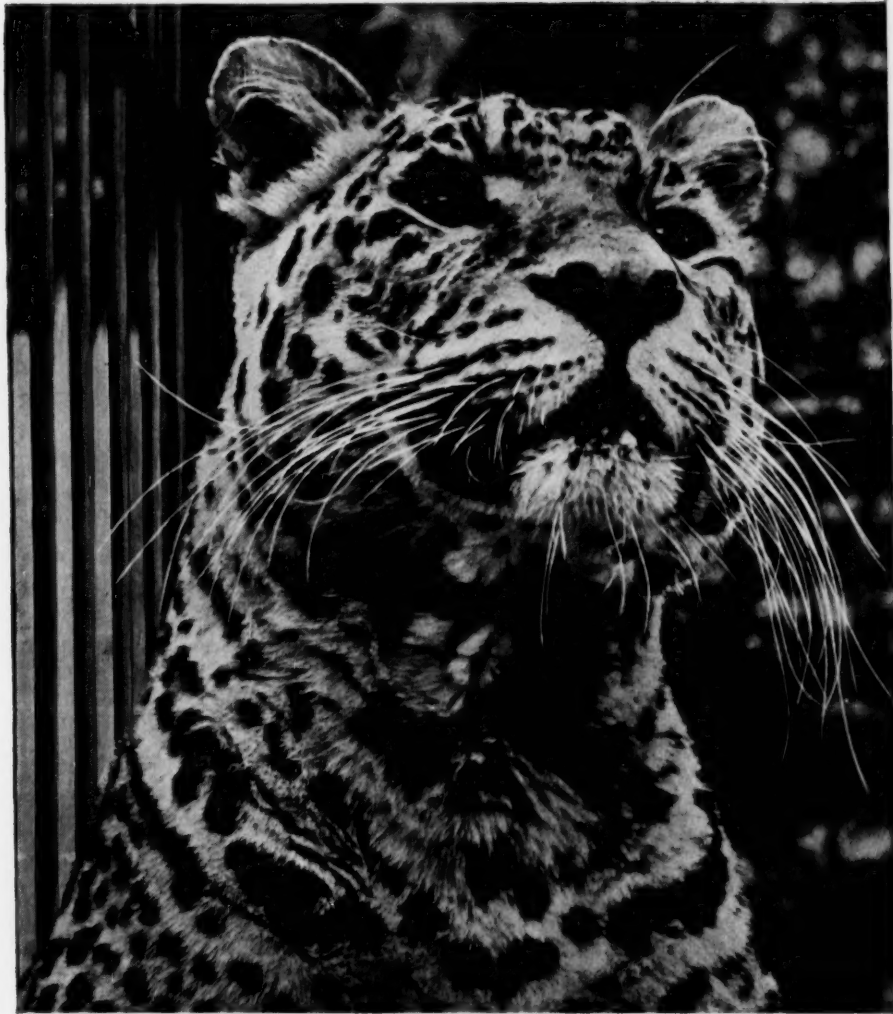


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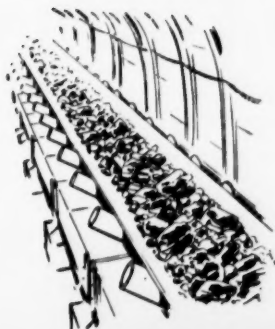
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NOTES AND COMMENTS

The New Plan for Steel

How much steel will be required in 1958 to satisfy the needs of British industry? Any attempt to answer this query must be exposed to the hazards of error and miscalculation which are inherent in a forecast of the shape of things to come. But the risks must be faced. Courage and careful planning in the post-war years have raised the U.K. to the foremost position in steel production amongst the States of Western Europe, and the further development programme covering the 1953-58 quinquennium, which has been published this week by the Iron and Steel Board, seems to be well designed to maintain the prestige of the industry in productive capacity and technical efficiency.

Involving an expenditure of £300,000,000 plus, the new plan is based upon an estimate that when 1958 is reached, the demand for steel will have risen to 22,500,000 ingot tons, of which 19,500,000 tons will be required for home consumption (including the manufacture of goods for export) and 3,000,000 ingot tons for direct exports. It presupposes that the rate of expansion in the requirements of the motor and the canning industries, for example, will be considerably accelerated, and may in fact approach ten per cent per annum in the next three years. It is assumed that requirements for defence will not change to any marked degree, but further increases in the volume of metal goods exported should be possible in view of the widening opportunities for capital development overseas. The report, indeed, goes further in affirming the likelihood of a general acceleration of the rate of industrial development at home and abroad.

Expansion of capacity will be mainly directed towards the increased production of steel plate, steel sheet and tin plate, supplies of which at the present time are notoriously deficient, but it is encouraging to observe that in the ideas of the Board these further projects do not represent finality. In the context of the national economy an expenditure of £60,000,000 a year may approach the limits of material resources and manpower which can be devoted to one branch of British industry, but the Board has already indicated that further schemes of modernization and expansion "are likely to be approved in the next four years" and will in the main effect production after 1958.

Taking time by the forelock Sir Archibald Forbes and his colleagues have already embarked upon an investigation of possible development in the 1960's. This embraces

the provision of the immensely increased supplies of iron ore, coke and other raw materials, the provision of sea and internal transport and a careful survey of the changes in labour requirements. No substantial variation in the total labour force is anticipated.

Perhaps the supreme justification of the development schemes already completed is the fact that whereas steel production has increased by 20 per cent since 1949 the total labour force employed has risen by only two per cent. Further economies in manpower are envisaged. In the modern steel plants the more arduous labours have been transferred from the workers to the machines. The next generation of iron and steel workers will be predominantly men of trained intelligence and technical skill, and the ambitious youth who seeks a career in this progressive industry has the assurance that there's always room at the top.

Arrival of the Synthetic Diamond

Another chapter heading in the development of synthetics and the search for substitutes was written last week with the news from the States that the General Electric Company has succeeded in producing artificial diamonds—at present in extremely small sizes. Similar results are also reported from Holland where the N. V. Bronswerk laboratory is reported to have produced a synthetic diamond weighing approximately one-tenth of a carat. Nothing is known here at present regarding these latter results beyond the bare announcement.

A certain amount of rather imprecise information is however available regarding the G.E.C. achievement from which it would appear that the crystal produced is not so much an artificial diamond as a diamond, produced by artificial means, which is indistinguishable from nature's product. Pending the granting of patents, G.E.C. is understandably reticent about the process, although it would appear that pressures of about 1,500,000 lb. p.s.i. combined with temperatures in the neighbourhood of 5,000 deg. F. are involved. It is also reported that the type of graphite out of which the diamond is produced is readily available and relatively cheap.

The diamonds thus far produced in the G.E.C. laboratories are in sizes ranging up to one-sixteenth of an inch for a single diamond and up to quarter of a carat for a single cluster. They have been produced at a cost of approximately

twice the market price of comparable natural diamonds. The G.E.C. is fairly confident of being able, in due course, to produce larger stones but it is of course quite impossible to visualize at present what costs are likely to be under mass production conditions. For this reason as for others any undue despondency in the diamond market would seem to be premature.

On considerations of price alone there seems no urgently compelling reasons for seeking a substitute for natural diamonds in the industrial grades while in the gem trade (where price in any event bears little relation to production costs) the effect of flooding the market with artificial gem stones, if it eventually becomes practicable to produce them, would merely be to spoil the market for the new entrant quite as much as for the established producers. It therefore seems reasonable to assume that the primary motive behind G.E.C.'s research has been to provide the States with a domestic source of supply in the event of war.

The United States is by far the largest user of industrial diamonds and latterly has been importing some 15,000,000 carats a year (worth over \$50,000,000), a considerable portion of which has been going into the stockpile. Moreover there is reason to think that the uncertainty which the States undoubtedly feels regarding the availability of supplies in a crisis, coupled with the expectation that the consumption of industrials—even in existing uses—is bound to grow appreciably in the next few years, has acted as a positive deterrent on tool designers to specify industrial diamonds in new uses where alternative materials could be specified. To this extent the development of a domestic source of supply might conceivably do the industry more good than harm by encouraging more confident reliance on diamonds in tool design.

Aside from these possibly optimistic considerations, the fact remains that a \$50,000,000 a year market is well worth breaking into, and if G.E.C. do succeed in making their prices competitive, it yet remains to be seen how elastic the Diamond Corporation's prices will prove to be under pressure.

The Outlook for Mining in Morocco

Purchases of lead and zinc by the United States government during 1954 raised the prices of these metals from the level attained at the end of 1953. The increased price applied more to lead than to zinc, at any rate in so far as the franc zone was concerned, and throughout the major portion of the past year this economic bloc maintained higher prices than those obtaining in either New York or London. Moroccan prices were higher than those ruling on world markets by as much as 104-116 Frs. per kilo for lead and by as much as 87-91 Frs. for zinc. Indeed, the fluctuations in the market prices led the government to modify its arrangements concerning the export tax on these metals.

Lead production in Morocco at 83,500 tonnes for the first nine months of 1954 showed a slight increase over the 110,000 tonnes mined in the twelve months of 1953, although output of zinc at 46,000 tonnes for the first nine months of 1953 suggest a slight decrease over the 65,000 tonnes produced in 1953. The fall in production was recorded principally from Bou Beker.

So far the effect of the rise in price does not appear to be reflected in higher production, since the three most important mines of the area, Bou Beker, Touissit and Aouli-Mibladen, have barely achieved the outputs they previously recorded. Yet thanks to the prices ruling during the last two years other Moroccan mines can produce economically—if the prices are maintained. These mines, Beni Tadjit in Tafilalet, and

Rehama, Assif el Mal, Toundout and Erdouz in Marrakesh, operated successfully last year.

Although few new deposits in Morocco were prospected last year, a site at Djebel Kketem belonging to the Société Minière Marocaine (Somina) was equipped on a small scale. The company has been formed by the joint action of private enterprise and the Bureau of Mineral Prospecting and Investment, and was financed entirely by Moroccan capital. Satisfactory reconnaissance work has also been undertaken at Jebel Aouam, in Central Morocco. In the future lead may be produced from this source in sufficiently large tonnages to counteract any fall in overall Moroccan production despite the decreased output of lead which is reported from the eastern portion of the territory, and which is the outcome of the greater profits gained from zinc.

During 1953 the lead smelting works at Oued El Heimer installed a treatment plant for the residues comprised of the fusion of minerals at the Newton furnaces. Throughout eight months 27,500 tonnes of mineral yielded 19,500 tonnes of soft lead, 25,500 kilos of silver and 440 tonnes of lead piping. The total sales from lead and zinc mines, and smelting works in Morocco during the eight months were 83,350 tonnes of lead of which 27,500 tonnes were supplied from the Oued El Heimer plant, 22,000 tonnes of soft lead, 26,700 kilos of silver of which 3,800 kilos were sold in Morocco, 512 tonnes of lead piping likewise sold in Morocco and 46,800 tonnes of zinc.

The Rhodesias

(From Our Own Correspondent)

Salisbury, February 18.

Sir Godfrey Huggins's statement, made in London recently, that it would be better if the Federation could wait two years before doing anything about the Kafue or Kariba hydro-electric schemes, has evoked a storm of protest within the Federation, particularly in Northern Rhodesia where hydro power is considered to be so essential to the future of the copper-mining industry. Mr. J. H. Lascelles, executive director of Rhodesian Selection Trust, said he agreed that it would be better if the Federation could wait two years before making a start on the Kafue and Kariba schemes, but, he said, the Federation just could not afford to wait. Other opinions expressed are that if Federation had not been brought about Northern Rhodesia would have been able to afford the Kafue scheme on its own, and (this from a Federal M.P.) that it was not surprising that, in spite of the spate of technical advice and the host of promises made, the Federal Government was now "thinking of indefinitely shelving the Kariba-Kafue question".

THE COPPERBELT STRIKE

Sir Roy Welensky, acting Federal Prime Minister, said in Salisbury this month that the direct loss caused to the Federation's finances by the Copperbelt strike was about £47,000 a day. Asked whether the Federal Government contemplated intervening in any negotiations which might take place, Sir Roy said that industrial relations were primarily a territorial matter, but in view of the heavy financial loss involved, the Federal Government had a direct interest, but constitutionally had no right to intervene.

Mr. Davenport, Southern Rhodesian Minister of Mines, recently forecast an improvement in the chrome marketing situation later this year. Chrome mining in the Colony

has been in the doldrums of late largely because the United States has not been stockpiling, but Mr. Davenport says the demand for chrome is already increasing. He expressed the opinion that tin, also, is likely to become of some interest this year with the starting up of the new smelter at Kamativi.

ANY HELP FOR GOLD?

The Minister felt that a further increase in the price of gold could not be envisaged and that the apportionment of territorial income was too restricted to permit of any general gold subsidy. Despite the rising cost structure faced by the gold mining industry during 1954, output had been worth £6,687,005 compared with £6,440,236 in the previous year. He reasserted the undertaking he had given that in the event of a mine closing—particularly when a section of the country was dependent upon that particular property—the case for Governmental assistance would be considered on its merits.

Mr. Davenport added that, despite the setbacks suffered by the asbestos industry owing to over production and bad grading of the shorter fibres, the market now seemed assured as it was in the hands of the groups most intimately associated with the manufacturer. Output last year for the lithium group of metals was valued at approximately £280,000, and he felt that this group would assume increasing importance as production grew and transportation facilities were widened. During 1954 scheelite production was valued at £171,000, while that of beryl was valued at £143,000.

PROSPECTS FOR COPPER

Development work on what were at one time considered to be very promising copper deposits near Sinoia, north of Salisbury, has ceased. Sebungwe Mines and Exploration Ltd. announced this month that it was withdrawing from the Copper Queen and Copper King mines after having spent more than £200,000 on geological and geophysical work, including an extensive drilling programme. The Copper Queen was first pegged in 1910 and a pilot plant, which gave excellent results, was erected in 1927. Unfavourable geological reports, coupled with poor prices in the base metals market at that time, led to the abandonment of the project. The owners of the Copper Queen and Copper King claims have stated that they will probably work the mines themselves.

Meanwhile, the Messina (Transvaal) Development Co. Ltd. has announced that results at the Mollie copper mine, also near Sinoia, indicate that minimum ore reserves there are in the region of 16,000,000 tons, which are estimated to contain 256,000 l.tons of copper. (See *M.J.*, February 18, page 187.) Messina (Transvaal) also owns the Umkondo mine, 140 miles east of Fort Victoria. Although Umkondo, which is nearing the production stage, will be a smaller property than the Mollie, laboratory tests in the Union and in the United States have indicated that good recoveries may be expected from both sulphide and oxide ore, and the chairman said last year that the average grade appeared to be about seven per cent copper.

PYROCHLORE IN NYASALAND

The pyrochlore deposits on Chilwa Island, situated in one of the lesser known of Nyasaland's four lakes, have come into the news lately. Described as a mineralogical paradise, the mineral deposits of the island's rocks include, in addition to pyrochlore, manganese and iron carbonates, apatite and fluorite. The extent of the pyrochlore deposits on the island has not been disclosed, but a mining company has been endeavouring to prove the deposits during the last two years, and it can be said that Chilwa may provide strong competition to other pyrochlore-bearing areas in Africa.

Western United States

(From Our Own Correspondent)

Portland, Oregon, February 8.

Lead-zinc producers are not wholly satisfied with present prices but they feel that the stockpile programme tends to lend stability to the market. It is expected that zinc will at least maintain its position and there is some hope of an increase in the price of lead.

Due to a resumption of normal production, after a shutdown of two and one-half years at United Park City Mines, one of the leading lead-zinc producers in Utah, International Smelting and Refining Co. (Anaconda) has resumed operations at its concentrator at Tooele, Utah, which has been inactive since July last. The smelter is expected to resume some time later this year and meanwhile concentrates are being shipped to Anaconda's plants in Montana, lead to Shelby and zinc to Great Falls.

Another resumption of operations after nearly a year of idleness is that of Telluride Mines in the San Juan region in Colorado. The reopening will be accompanied by reconstruction of the mill and extensive underground development. Monthly production of 38,000 tons is planned. Telluride is a subsidiary of Idarado Mines which is controlled by Newmont. In the Coeur d'Alene district Bunker Hill and Sullivan and Hecla jointly have negotiated a contract with D.M.E.A. for sinking a 2,080 ft. shaft and driving 6,400 ft. of lateral development work on Silver Mountain ground in the eastern end of the district. The programme involves an expenditure in excess of \$1,000,000, one-half of which will be by D.M.E.A. loan. The westerly portion of the Coeur d'Alene district has been the more intensively developed but more recently the easterly portion has been the object of several deep projects, results of which have been, on the whole, encouraging.

Anaconda is reopening its Darwin mine in Inyo County, California, after it has been closed for the past year. The Darwin is the principal mine in the district of that name and was noted for its rich silver ore some generations ago. With the exhaustion of the high grade ore bodies the district lay idle for many years until recently when it was revived as a producer of lead and zinc.

IMPROVED OUTLOOK FOR MANGANESE

The outlook for manganese in Arizona is improving as O.D.M. has authorized the purchase depot at Wenden to buy an additional 1,200,000 l.tons of ore. The news is encouraging as the depot has almost completed its original quota and O.D.M. had announced its intention to discontinue further purchases. Arizona Materials Service Co. has purchased the old Shattuck-Denn mill at Bisbee and is converting it to treat manganese ores from a large deposit near Tombstone which is amenable to surface mining. Mill treatment is by sink and float and flotation. At Reno, Nevada, Nevada Ore Refining Co. has commenced operation of its plant which will produce different grades of manganese metal and chemicals, utilizing ores that do not meet the specifications of the government stockpile.

Pacific Northwest Alloy Co. has entered into contract with G.S.A. for processing 20,000 tons of chrome concentrates to low carbon ferrochrome at its electric furnace plant at Mead, Washington. One half of this amount will be supplied from a government stockpile at Nye, Montana, and Pacific Alloys is completing a 150 ton concentrator to furnish the remainder by upgrading concentrates from Oregon beach sands now stockpiled at Coquille, Oregon. During World War II extensive attempts were made to recover chromite from the large deposits of sands in the vicinity of Coquille but without entire success at that time.

Steel Booms in Europe—Firms Up in U.S.A.

(From Our Iron and Steel Correspondent)

The overwhelming rush of applications for the equities of Colvilles and Whitehead Steel recently offered for public subscription by the Iron and Steel Realization and Holding Agency and the substantial premiums which are now obtainable on the issue prices, are no doubt capable of a simple explanation. Current valuations on the Stock Exchange offer few opportunities to investors for a return of over 6 per cent on an apparently sound industrial investment, and the outlook for steel has seldom, if ever, been more encouraging.

In this country there is an immediate shortage of supplies. Although the steel industry made an excellent start to the new year by producing a record output of ingots and castings in January, makers of some types of steel products are fully booked for six months ahead and buyers of pig iron, scrap and semi-finished steel are reported to be scouring European and American markets in search of supplementary supplies.

THE INDUSTRY IN WESTERN EUROPE

Conditions in Western Europe are not dissimilar. New records of production were attained last month in Germany, France and Italy, and the aggregate ingot output in the area of the six member States of the European Coal and Steel Pool was 4,132,000 tons which is well in excess of any previous performance. Similarly, output from these countries during the whole of 1954 showed a 10 per cent increase over 1953 at 43,812,000 tonnes against 39,656,000 tonnes. Nevertheless there, as in this country, supply has been outpaced by a rising demand.

Are these conditions likely to continue? Is there a real shortage and if so how short is steel? The answer to these questions is surely to be found on the other side of the Atlantic. With an expanding home demand and much more extensive export inquiries, American and Canadian production is rising rapidly. In the first week of February the American Iron and Steel Institute reported that ingot output had reached 2,110,000 tons compared with 1,774,000 tons in the corresponding week of last year. But the essential point is that steel mill operations were still scheduled at only 87.4 per cent of rated capacity, and good business will have to be better still before the plants are restored to full employment.

The step up in European buying of American steel has encouraged one large producer to forecast the export of 3,000,000 tons, about 400,000 tons more than in 1954. But the change is less in bulk than in the nature of demand. Many of the orders now being placed by European buyers are for slab billets and not rolled sheet in coils which require further processing in the rolling mills.

Listed prominently amongst British requirements for the current year are 100,000 tons of tin plate and 220,000 tons of sheet steel for the motor industry with smaller tonnages of rails and plates.

To assist these purchases of foreign steel, the import duties have been suspended until mid September by which time British steel production and demand should be more nearly in balance, as more new plant will then be available for operation.

One inestimable advantage enjoyed by British steel makers, which encourages hopes of continued activity when more intensive competition in world markets eventually

develops, is the relatively low cost of production and quoted prices of the principal products.

There have been a few minor variations in the fixed maximum prices during the past month—not all in an upward direction. Maximum prices of bright steel bars, for instance, have been reduced by amounts ranging from 2s. 6d. to 26s. per ton, whilst the rises in the price of alloy steels have been carefully calculated to cover no more than the extra cost of tungsten nickel and molybdenum.

The general level of British steel prices is unchanged and these not only provide a favourable background for the expansion of direct exports, but also assist engineers, ship builders, and makers of machinery in the more keenly competitive conditions which are developing in world markets.

THE ORE POSITION

This country emerges no less favourably from a comparison of raw material resources. At no time throughout the past year has the industry been seriously handicapped by any lack of raw materials. Coal supplies have been adequate if not abundant, coking capacity is steadily increasing and if there has been a slight decrease in the output of home ores this has been more than offset by an increase of 660,000 tons in the exports of foreign ore to a total of 11,619,000 tons for the year 1954.

France, on the other hand, has been, and still is, very short of coke and scrap. Germany has received reduced supplies of ore from France and Sweden while Washington reports that iron ore production in the United States in 1954 dropped 34 per cent below the record figure attained in the previous year. American steel interests are devoting a good deal of attention to the "beneficiation" of taconite and other native ores, but for the rapid expansion of external supplies of iron ore they are looking northward with unceasing hope and confidence.

The vast development of the ore fields in Quebec and Labrador is designed primarily to meet the swelling requirements of American steel. To an ever growing extent the United States is now dependent on imported ores. Arrivals last year are estimated at about 15,000,000 tons which in turn were about 4,000,000 tons in excess of the 1953 imports.

Canada is already the principal source of supply although substantial tribute is also levied upon Chile, Peru and Venezuela, and as the yield of the ore fields in the Northern Territories continues to expand, shipments to the U.S. from European and W. African sources may be expected to decline. New docks are being built on the Western Coast, some mammoth ore carriers with capacities up to 30,000 tons have been built and the construction of the great St. Lawrence Seaway has begun with the spring of 1959 as the target date for completion.

PROBLEMS OF THE SOVIET BLOC

Meanwhile, the dramatic political changes in Moscow and the forecast of a re-direction of the Soviet economy which accompanied the deposition of Malenkov and his confession of guilt has focused attention on the steel industry on the further side of the Iron Curtain. Like so many of the official statements emanating from the Kremlin the promise of further concentration on the heavy industries awaits more precise elucidation.

Although precise statistics are not available it appears that in the U.S.S.R., Czechoslovakia and Yugoslavia the planned estimates have been attained, but that there have been deficiencies in East Germany, Poland, Hungary and Rumania. Moreover, it is affirmed in an official Washington report that high furnace heats, badly prepared refractories, ashy cokes and similar detriments to good furnace practice have limited Soviet steel outputs.

Moreover, the problem of ore supplies is compelling the Soviet Union to go further afield in its quest for smelting material. There are no doubt immense natural deposits in remote areas such as Manchuria and North Korea, but it is obvious that great distances and lack of transport facilities must seriously handicap the development of these sources of supply.

In any event it may be observed that the target figure of 60,000,000 tons fixed by the Soviet Union for its steel industry in 1960 is less than the present combined output of the U.K. and the European Pool and is barely half the rated capacity of the U.S.

Finally, it remains to be said that although M. Jean Monnet persists in his determination to retire from the presidency of the High Authority after having seen the European Coal and Steel Pool through its teething troubles, a successor has yet to be appointed. There have been repeated postponements, but once the French cabinet crisis has been resolved it is expected that the Common Assembly will be immediately summoned to Strasbourg to reach a final decision.

The Coal Industry

(From Our Coal Correspondent)

The outstanding news of the month for the British coal industry was the announcement by the Government last week that top priority is to be given to a vast atomic energy programme. The outlines of the scheme were given in *The Mining Journal* last week under "Notes and Comments".

Some atomic authorities predict that if developments in this sphere continue at the present rate the results may be even more spectacular than those envisaged in the White Paper, and that within a quarter of a century it is possible that all of Britain's electricity requirements will be met by a handful of atomic energy plants.

What of the capital outlay involved? This will mainly be found by diverting money earmarked for the building of projected conventional power stations. Whilst realizing that the estimated cost of building the twelve power stations may fall far short of the actual cost the U.K. Government is prepared to accept the risk, the official comment being that "the stakes are high, but the final reward will be immeasurable".

The sites for the new atomic power stations have not yet been chosen, but the first plant is expected to be in operation by 1960. Long distance high tension transmission could enable power stations in the Midlands to serve London. The cost of producing electricity by nuclear energy will initially be roughly equivalent to that generated in conventional plants (approximately 0.6d. per unit) but Sir Christopher Hinton, production chief of Britain's atomic factories, has intimated that this cost will certainly be reduced in time.

This far sighted and realistic project may well mark the beginning of a new Industrial Revolution but whilst that of the nineteenth century brought about the expansion of the coal mining industry, the effect of this new Industrial Revolution of the twentieth century may not be so favourable. Accepting the fact that *per capita* consumption of

coal may exceed the current figure of four tons per year, it is still difficult to reconcile certain features of the possible energy picture in, say 1975, with the statement in the White Paper that there can be no question of a reduction in the mining labour force of that time.

THE FUTURE DEMAND FOR COAL

Consider the position in twenty years' time. The long term plan of the National Coal Board will have paid off and the annual output of coal will be 40,000,000 tons greater than currently. The nationalized railways will have replaced steam locomotives by diesel and electric engines according to plans recently published. This will save some 10,000,000 tons per year. Again there may well be a drop in the demand for British coals by importing countries, for it can be reasonably assumed that the utilization of industrial atomic power will not be confined to Britain. It is impossible to assess the precise effect industrial atomic energy will have on our exports twenty years hence, but the drop in demand may be of several million tons.

Even though the *per capita* energy consumption may increase, internal domestic use of coal as a fuel may be considerably reduced as more non-solid fuels become available and the old fashioned open coal fire makes its predicted disappearance.

Add to these considerations the 40,000,000 tons of coal saved by using atomic power stations and the resulting overall picture may reveal a possible drop in the demand for coal such as could well prove an embarrassment to the N.C.B.

NEWS FROM ABROAD

In Germany the brawl between Herr Reusch, the Ruhr industrialist, and the combined steel and coal unions flared up into strike action which cost the country a half million tons of coal. Dr. Adenauer, the West German Chancellor, in smartly rapping the knuckles of both parties made it clear that the economic stability of Western Germany cannot afford retaliatory strikes because of misguided criticism of trades union methods by employers. In this instance the unions were incensed by Herr Reusch's assertion that the workers had secured a share in the management of industry by underhand methods.

From the Far East comes news of negotiations between China and Japan with a view to the latter importing coking coal from North China. This market is at present held by America but the rise in the price of American coal is causing Japanese steel mill owners to seek alternative supplies. Australia recently sent a coal export group to survey the Far Eastern markets and their report stresses the possibility of supplying Japan, Hong Kong and Singapore with superior gas-making coal.

India has decided to go ahead with a large-scale project to exploit the 2,000,000,000 ton lignite deposit at Neyveli in the south of the country. A co-ordinating committee has been appointed to prepare a report on the mining and utilization of the lignite and the British firm of Powell Duffryn is to assist this committee. Mining operations will be complicated by the presence of subterranean water but if the project can be successfully carried through the lignite will provide a basis for the industrialization of Madras State and ensure Southern India's fuel for 400 years.

An underground explosion at Amlabad Colliery, 12 miles from Jahria, India, is feared to have cost the lives of 55 miners; 257 men were underground at the time of the accident and all but the 55 were safely brought to the surface. The work of the rescue teams striving to reach the trapped men is being hampered by the threat of further explosions.

Specialized Furnaces for Smelting Ores and Residues

By C. C. DOWNIE.

Furnaces for smelting ores and residues other than the familiar blast furnace and reverberatory types, have been developed in different directions of recent years. Rotary furnaces fired by solid fuel, gas or oil, appear to have been more widely applied in the United States and in Continental countries than in the United Kingdom, but the expansion of the use of electric hearths has tended to be somewhat slow for this particular purpose although these are increasingly utilized as the actual melting medium. The following article briefly describes the various designs of furnaces employed in handling different classes of ores.

In handling the poorest grades of metalliferous waste materials, residues, and ashes, which formerly were discarded, the advent of a large-scale rotary system, by dint of minimizing fuel costs and labour, has made it possible to work these wastes economically. This relates to materials containing one or two per cent of copper, zinc, and lead. Such material was formerly allowed to accumulate together with clinker and rubble, and subsequently dumped as worthless. By introducing lengthy inclined rotary kilns fired by solid fuel of the cheapest grades, the raw material, coarsely ground and mixed with fuel and other additions, is continually fed-in either in moist, sludgy, or dry condition, as it has obtained on the waste dump. The mass traverses the rotary kiln in a matter of two hours, and wherein air for combustion enters in a direction opposite to that of the descending material.

The zinc-oxide and lead-oxide gases from the other end of the kiln pass through a cooler, and (depending on the size of the layout), either a bag-filter arrangement, following preliminary dust extraction, or an electric filter. These oxides are reclaimed in this manner, and the gases are moved through the plant by means of a fan placed behind the electric filter, or ahead of the bag-filters, while at the discharge end of the kiln, an auxiliary furnace is situated. The flame from this is made to enter the reaction zone together with the reaction air when the necessity arises, and either pulverized coal, gas, or oil is used as the heating medium for this unit.

Outgoing gases dry the fresh charge in the upper part of this kiln, and raise it to some 1,000 deg. C. where the heat enters the mass in part directly from the gases by way of the continually shifting surfaces, and partly by radiation. The kiln gases are very thoroughly utilized in pre-heating the charge by this double heat transfer, and although in the main zone, the temperature is 1,200 deg. C. the final exit gases are reduced to an average of between 300 deg. and 600 deg. C. Material of the sulphidic order does not require previous roasting to be worked up by this process, so long as a sufficient amount of copper or other component having an affinity for sulphur exists. This system is claimed to have recovered many thousands of tons of lead and zinc oxides which formerly had been ignored, while the copper content is obtained in the form of a poor matte for disposal to regular copper smelters.¹

ADAPTION OF STEEL MELTING PRACTICE

For handling the more refractory classes of ores, other forms of rotary furnaces fired by gas or oil have been designed, and some of the large smelters have given attention to an arrangement normally intended for steel melting. This rotary hearth is provided with a specially designed burner, which produces an intensive flame suited to the drum-form, and permits the furnace atmosphere to be either oxidizing, reducing, or neutral. At the same time, this allows regulation of the heat input within fine limits, whereby even at high temperatures, excessive or undesirable losses are avoided.

The sizes range from 220 to 33,000 lb. and they are well suited for fluctuating supplies, and make for economical handling. A boiler plate shell lined inside with a jointless coat of tamped refractory makes up the drum, which is carried on two pairs of rollers, one of which is driven by electric motor over a wormshaft. As the burner-end of the drum is in the form of a cone frustum, it makes an almost air-tight fit against the stationary burner unit.

The hinged charging door with the gas outlet is located at the other end of the drum, and the gases pass over a swinging waste-gas pipe which is bent into the air heater to conserve heat, while the drum jacket also contains a small door for removing slag, and the tap-hole spout. High temperature rotary hearths of the kind have been somewhat slow of acceptance for smelting fluctuating consignments of refractory ores, but hold many advantages, as the continual movement affords scope for fluxes to function more perfectly, and the enclosed type of drum hearth makes for heat economy.²

For the calcining of chrome ores with dolomite, rotary hearths fired by pulverized coal, and operated at a fixed rate of rotation, are to-day claimed to completely outclass the earlier multi-deck calciners, or hand-rabbed reverberatory hearths.

USES OF SMALL MUFFLES AND HEARTHS

The method of directly preparing nickel parts by sintering the powdered metal, is now well established under the category of powder metallurgy. The original system, introduced prior to the late war period, showed the various advantages of sintering at some 1,200 deg. C. in moulds, for subsequent pressing, forging, or rolling.

A reduction in volume of some 60 to 70 per cent takes place during the heating process, while the density changes from about 0.07 to 0.11 lb. per cu. in. of the original powder, to some 0.235 to 0.27 lb. per cu. in. of solid, but yet porous, sintered body in a matter of two hours. By then pressing, forging, or rolling the sintered body becomes completely homogeneous, with a specific weight of 0.318 lb. per cu. in. This is done without cracks forming, and the process briefly obviates the formation of segregations and inclusions, the absorption of sulphur, etc., from gases, and forestalls the need for adding magnesium or manganese, all of which are features of the melting process. What was not made clear was that while the nickel powder obtained by thermal decomposition of nickel carbonyl sufficed as the raw material, a corresponding material could be acquired by electro-refining, as distinct from the somewhat circuitous method of obtaining only thin cathode sheets, necessitating subsequent remelting. Detailed accounts of the physical properties and characteristics of the sintered body following mechanical treatments have appeared.³

While different forms of electric muffled furnaces have been used for the foregoing work, a high-grade heating element is used to ensure that actual hearth temperatures of 1,250 deg. C. are obtained with ease.

This involves the use of a proprietary alloy composed of 65 per cent iron, 30 per cent chromium, and 5 per cent aluminium, which can be raised up to 1,350 deg. C. whereas ordinary nickel-chromium heating elements are limited to some 1,150 deg. C. The elements are accommodated in the walls, the ceiling, and the bottom of the muffle furnace of larger sizes. In order that ample room is afforded for scale to collect without interfering with the resistors, the recesses are built-up to advantage with obliquely placed bricks. Dimensions of some models of this muffle are 30 by 16 by 16 in., for a connected load of 30 kW., and are also provided with automatic temperature regulation. Smaller models are 24 by 6 by 4 in. for connected load of 6 kW.

As the resistor is wound on the inner surface of the furnace, the efficiency is increased, and this construction can be adopted because the work is introduced along two rails of the heat-resisting material provided in the interior of the muffle. Injury to the heating wires is thereby excluded, and a special contact is provided on the door, so that when opened, the current to the bare winding is interrupted. A ramification of this is the vacuum tubular furnace which is necessary in the melting and handling of a number of the rarer metals, which are guilty of absorbing gases unduly from the atmosphere. This type of furnace can either be worked under vacuum or be filled with an inert gas. The length is 6½ ft. with an internal dia. of 4 in., and at an input of 15 kW. attains a maximum temperature of 1,200 deg. C. The two ends of the tubular construction are sealed by water-cooled detachable covers, bolted to the outside of the casing, and one of these covers has a quartz glass inspection window which is also water-cooled.⁴

DIRECT ELECTRIC SMELTING

While the refining of impure lead is usually undertaken in gas, oil, or coal fired kettles, where these fuels are not available in outlandish areas, the use of an existing electric internally heated salt-bath tub furnace proved a unique adaption. Several heating tubes on the order of immersion heaters are submerged in the tub, the heating elements of which can be replaced during operations without removing the tubes.

Such internal heating does not yield effective heat utilization, but has advantages in that no pipe-lines are necessary, leakage can be excluded using an improvised tub as the hearth, and advantage can be taken of existing current.⁵

The direct smelting of concentrates without the need for briquetting, where no fuel is available at the mine head, using electric furnaces, obviates the trouble and costs of shipping to the smelter. Although proposed many years back, electric smelting has only enjoyed somewhat fluctuating fortunes, but different ramifications of the Wile design claim to have made some hundred installations. These are engaged to smelt copper silicate ores, other copper and silver ores, nickel and cobalt ores, and the reclaiming of metallic values in slags from ordinary fuel-fired hearths, etc.

Briefly, this comprises a shaft type of furnace, water-jacketed on the bottom, with automatic controls for the electrodes, and operates in conjunction with chambers for the expansion of the gases, besides dust collecting devices to collect all values in the fumes. Provisions are made for replacing a burned out roof without stopping the furnace in a matter of minutes, to facilitate continuous operation, whereby capacity is not rated in tons per heat, but per 24 hours. Current consumption approximates to 250 kW. per ton of charge, and produces temperatures upwards of 3,000 deg. C. and the main feature is to keep the hopper above the furnace, and the furnace chamber full at all times, with intermittent tapping of slag and metal. What are normally regarded as infusible ores containing from 1

to 2 oz. of gold per ton with a little copper are claimed to have been successfully handled. With this slag-resistance arrangement, the charge condenses any of the values which may be volatilized, thus eliminating baghouses, or other outside devices for reclaiming these values, while the slag exerts a strong refining action.⁶ Another form of electric smelting hearth by Jens Westly uses from three to six electrodes in smelting ore comprising copper pyrites, iron pyrite, and pyrrhotite, and containing 28 per cent silica, providing a matte up to 40 per cent copper.

One model for handling other copper concentrates uses three electrodes of the continuous Soderberg type, 56 in. in dia. The material containing 24 per cent copper, has a fineness of 80 per cent through 200 mesh sieve, which otherwise would have necessitated briquetting, and gives a matte of 45 per cent copper.⁷ Many of the claims, and not a little of the literature on electric smelting of zinc and other ores, using alternative designs, do not appear to be justified.

Lastly, the melting of tungsten, platinum, and other high-melting point metals, which more relates to laboratory practice, has benefited by self-contained, ready-to-use furnaces which are directly connected to the supply line, where the crucible is placed between contact heads and thereby inserted into the secondary circuit of the transformer. This forms the resistance, and thus becomes heated by the passage of the current, whereby temperatures of up to 3,000 deg. C. can be attained. Four sizes of 3, 6, 12, and 25 kW. output are available, and apart from the usual tilting crucible system, where the highest temperatures are required a carbon crucible is placed upside down over the small hearth, thereby permitting heating from all sides, as this serves as the resistance, and is protected from burning by suitable coating.⁸

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1. Krupp Grusonwerk, Magdeburg-Backau.
2. Fulmina, Edingen, Mannheim.
3. Hamprecht and Schlecht, for Farbenindustrie, Ludwigshafen.
4. Developed by Heraeus-Vacuumschmelze, Hanau.
5. Durferriit, Frankfurt.
6. Electric Smelters Inc., Colorado, U.S.A.
7. Sulitjelma Copper Company, Sulitjelma, Norway.
8. Helberger, Munich.

Development of N. Ireland Perlite Deposits

The prospect of substantial employment in the development of perlite deposits in County Antrim, Northern Ireland, will depend upon the extent to which suitable processing methods can be developed, said Lord Glentoran, Minister of Commerce, in the Northern Ireland House of Commons this week. He added that for several years a local firm, which was a subsidiary of a British concern, had been seeking to develop deposits of perlite in County Antrim. The existence of those deposits has been known for many years to the geological survey, but the discovery that perlite could be processed for commercial uses was not made until some time during the last war.

The work to date in County Antrim had consisted mainly of extracting the mineral for purposes of experiment in order to find the best method of processing. Some of this processing work had been carried out in the firm's local factory. Lord Glentoran pointed out that only a small amount of employment as yet had been provided, and at this stage he would not like to venture an opinion as to the extent of employment which might be provided in the future through the development of these deposits.

Crushing and Grinding Plant for Operation in the Mining Industry

It is some considerable time since any account has been given in these columns of the contribution being made by Pegson Ltd., of Coalville, to the crushing and grinding problems of the metalliferous mining industry. The article which follows describes a number of the installations with which this firm has been associated. It will be observed that the majority of those mentioned relate to mining operations in Southern Africa.

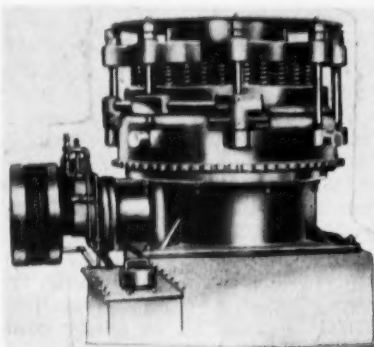
Crushing and grinding are operations of critical importance in the extraction of metals from ores or in the separation of one mineral from another. Progress in extraction metallurgy and beneficiation processes is therefore making increasing demands on the reduction plant. Consumers are also becoming more and more exacting and are seldom willing to accept consignments of crude minerals as mined.

In order to meet the stringent requirements of present-day crushing practice, all reduction processes must be very precisely carried out. It is also essential that the crushing plant should be capable of giving dependable service over a long period with minimum stoppages for repairs and maintenance. Reliability is a consideration of particular importance to mines with limited repair facilities, which are situated in areas remote from the supplier's service depot. In order to ensure satisfactory operating results, the conditions and requirements of the particular job should be very carefully considered when installing a crushing plant. If necessary, specialist guidance should be obtained.

Among the manufacturers who have made a special study of mining requirements is Pegson Limited, who have supplied jaw crushers, gyratory crushers and rod and ball mills for minerals and metal mining throughout the world. Much of this equipment has gone to Southern Africa, where typical examples are to be found in gold, copper, diamond, asbestos, chrome and tin ore mines.

At the Premier Diamond Mine a 48 in. Pegson Telsmith Gyrasphere has been installed to crush the diamondiferous

ore. This crusher is capable of producing 110 tons an hour of minus $\frac{1}{4}$ in. ore from a minus 2 in. feed. It has been found that the design of the concaves results in a much smaller proportion of oversize than with other machines of this type. This has the effect of reducing the circulating load on the machine and hence increasing the throughput. Further tests have shown that at a $\frac{1}{4}$ in. setting this gyrasphere is capable of a throughput of almost 200 tons per hour.



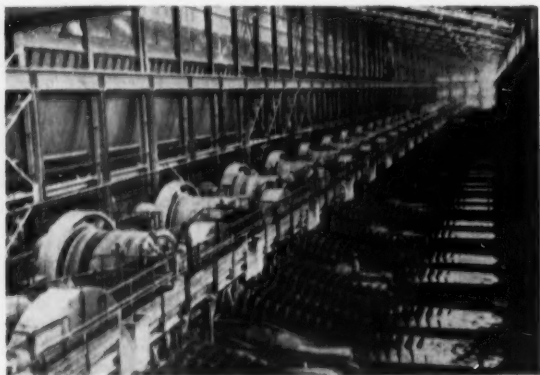
The Pegson Telsmith Gyrasphere

In the world famous Kimberley Diamond Mine a Pegson Telsmith 36 in. gyrasphere, with specially designed concave and mantle is wet crushing "blue ground" or diamondiferous ore from a minus 2½ in. feed, to a minus $\frac{1}{4}$ in. product at the rate of 65 tons per hour. No repairs to this crusher have been required in two years of arduous crushing. The well designed seal ring has been impervious to the ingress of dirt, there has been no water-oil contamination, and

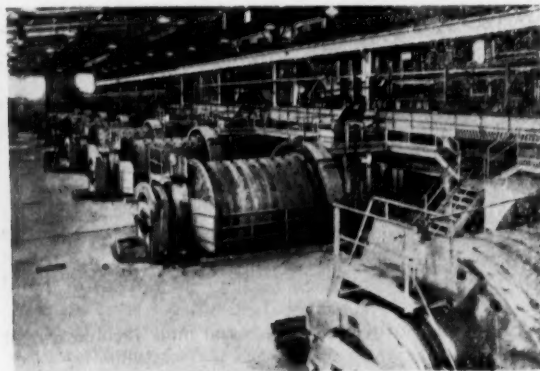
horse power consumed per ton of ore crushed is highly satisfactory.

A plant installed by Rhodesian Alloys Ltd. for the reduction of chrome ore consists of a 10 in. x 21 in. single toggle Pegson Telsmith crusher and a 24 in. Pegson Telsmith fines gyrasphere. Although the chrome ore is amongst the hardest of known ores, this plant is giving an output of 8/10 tons per hour. The works engineer has stated: "The crusher which we have at present in the raw materials bay has given good service, and has never caused a stoppage, which is unusual for hard-worked jaw crushers."

At the Shabani Mines in Southern Rhodesia, there is in



Marcy rod mills installed in line in Arizona, United States. There are twenty-eight mills 10 ft. by 10 ft. and the plant handles 50,000 tons a day grinding from $\frac{1}{4}$ in. to 48 in. mesh



Marcy rod mills installed in Montana, United States. Eight of seventeen 9 ft. by 12 ft. units are illustrated. These rod mills are used on single pass grinding

operation one of the most up to date plants in Africa. This comprises four—18 in. x 32 in. single toggle roller bearing crushers, followed by six—36 in. and four—48 in. Pegson Telsmith gyraspheres which reduce asbestos fibre of the type known as chrysotile. This rock has a long fibre which commands a much higher price than amosite, a variety of asbestos which is very widely found. To counteract the packing effect met with in this material, special cast steel eccentrics were fitted to all gyraspheres. Other Pegson Telsmith gyraspheres are working on the latter material with very satisfactory results.

REDUCTION TO FINE POWDER

Pegson Marcy ball and rod mills are widely used in the reduction of hard materials to fine powders. In general, rod mills are used for coarser grinding and ball mills where a finer product is required. Both types of mill can be used in conjunction with water classifiers, oversize being returned to them. Alternatively they can be air swept, when suitable air separators and cyclones must be provided. Wet grinding will increase mill capacities by 33 per cent, and special types of liners, balls or rods, can be fitted to suit the particular material being ground. Some users—the paint industry for example—require linings and mill charges of materials such as steatite, porcelain or flint, which will not contaminate the product.

A mill having several features of an unusual nature was recently supplied to grind chalcopryite concentrate (sulphur copper ore) from the tables to minus 60 mesh. In this instance the ball mill operated in closed circuit with an Akins or rake type classifier. To ensure that all the product was to the required size no grinding media was provided all the grinding being carried out by the material rubbing on itself. Due to the lower density of the material, the size of the mill was, of course, increased.

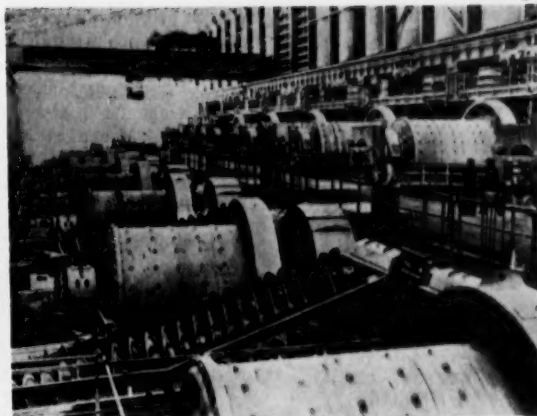
As an example of a rod mill, reference may be made to a unit which is grinding granulate to a minus 3/16 in. product from a 1/2 in. feed. This 4 ft. x 10 ft. mill has a capacity of 13 tons per hour, operating dry.

IMPROVED REDUCTION STANDARDS

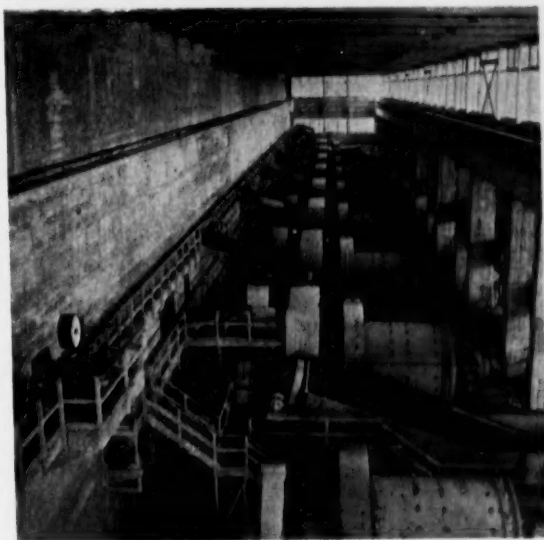
In recent years there has been a growing need for equipment specially designed for the reduction of hard and abrasive materials down to fine powders, capable of meeting increasingly stringent requirements. Trends now apparent afford a definite indication that specifications will be harder to meet in the future. It is this consideration which has prompted Pegson to develop the Marcy centre peripheral and end peripheral discharge rod mills, which have been engineered to ensure continuous, trouble free, efficient and economical operation. Made in a range of sizes, with capabilities from three to 250 tons per hour, these mills are capable of taking a feed as large as 2 in. and making a product as fine as 50 mesh.

An outstanding feature of the rod mills is their adaptability for handling wet and sticky ores which normally cause difficulty in crushing operations. Another advantage is that by using wet grinding the problem of dust can be completely eliminated and capacities increased by 33 per cent.

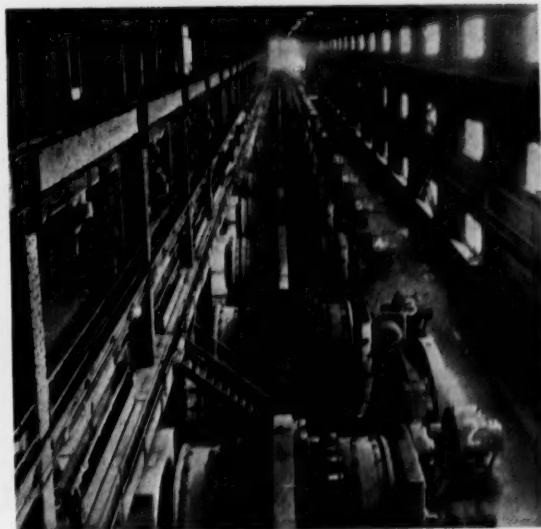
Typical installations of Marcy rod mills include one of thirty-four 7 ft. x 15 ft. units and another of thirty-two 6 ft. x 15 ft. units, the latter having a daily throughput of over 50,000 tons, with each unit grinding a 1/2 in. feed through 65 mesh at the rate of 1,600 to 1,700 tons a day. Machines installed for the fine grinding of tungsten in the form of



Marcy rod mills in Chile. Ten 10 ft. by 14 ft. units on single pass grinding followed by ten 10 ft. by 14 ft. Marcy ball mills



An installation in Mexico of nine 10 ft. by 10 ft. Marcy ball mills grinding copper ore from 1/2 in. to 48 mesh



Thirty-four 7 ft. by 15 ft. Marcy ball mills installed in Canada

scheelite include four Marcy mills for grinding the ore very finely in order to release the copper and molybdenum values. A well-known lead company has an installation of four 6 ft. x 12 ft. Marcy rod mills each doing 1,000 tons per day from $\frac{1}{2}$ in. to 20 mesh, which operate in close circuit with vibrating screens. The product from these mills is treated on seventy-eight concentrating tables and great care has to be taken in handling this ore, so that the slimes are kept to a minimum.

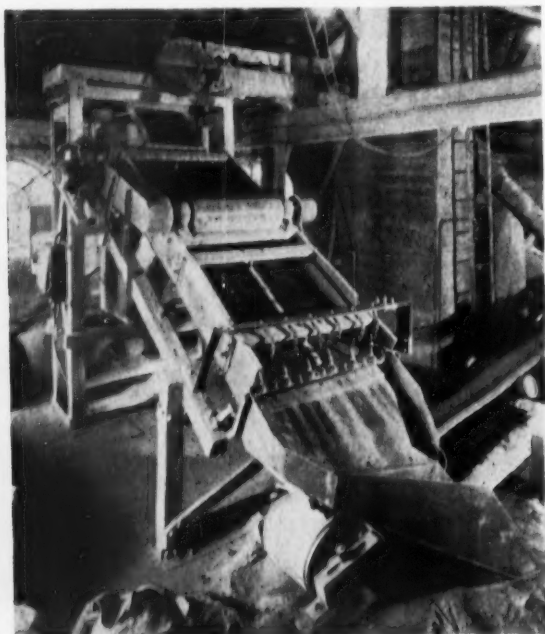
A Pegson Telsmith 18 in. intercone crusher is used for crushing emery rock. The abrasive nature of the material makes this job an extremely difficult one, but, due to the parallel motion of the machine, wear is kept to the very minimum and the reduction from 2 in. to minus $\frac{1}{4}$ in. is performed to the entire satisfaction of the customer.

CRUSHING EQUIPMENT INSTALLED AT MINES IN CENTRAL AFRICA

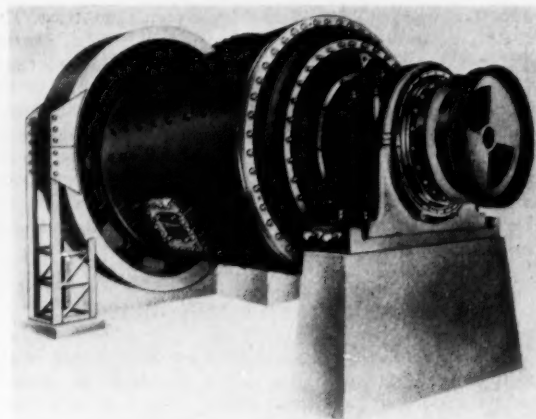
For the Kilembe Copper Mines in Uganda, a 20B Pegson Telsmith gyratory crusher is being supplied. This has been specially modified to suit the required duty. This is a service which Pegson Limited is always prepared to render. In this instance the feed opening and the taper of the jaws have been modified in order that the crusher may cope with the copper-cobalt sulphide ore. This unit will produce 200 s.tons per hour of 2 $\frac{1}{2}$ in. down material from a feed size of 14 in.

At the remote Williamsons Diamond Mines in Northern Tanganyika a 25B Pegson Telsmith gyratory crusher has been supplied through Messrs. Mitchell Engineering, Ltd. This crusher, which has a weight of 50 tons, is mounted on a special portable carriage. It is capable of dealing with 350 tons per hour of tough diamondiferous rock and was purchased after the customer had expressed his satisfaction with a 24 in. Pegson Telsmith gyrasphere.

In the tin mining industry, the company's 36 in. gyraspheres are handling tin ore at outputs of 55 tons per hour



A heated screen mesh developed as an answer to certain plant operating problems



One of a batch of six 12 ft. by 13 ft. Marcy ball mills now in operation at Michigan, United States, grinding very finely disseminated copper ore from $\frac{1}{2}$ in. to 150 mesh

of minus 5/16 in. material. Since these mines are 1,300 miles from the nearest town, it was of the utmost importance that thoroughly reliable machines should be installed.

SCREEN MESH HEATING DEVELOPED BY OPERATION RESEARCH

Besides specializing in the design and construction of dependable crushing plant, Pegson Limited have made a close study of operating requirements and problems. Particular attention has been devoted to the enormous expense involved in the replacement of screen meshes, and the large labour bill for the continual attendance necessary on the screens, which, under certain circumstances, tend to "blind."

To overcome these difficulties, the company has developed a special method of heating screen meshes by applying a low voltage high amperage current to the mesh. The connections for the electrical current are made at each end by means of a braided copper wire. These wires are connected to busbars which run to a transformer situated at any convenient position. Each job is engineered to suit the particular requirements of the customer, for screening is affected not only by the amount of moisture in the material but also by the humidity of the atmosphere, which may vary from day to day. These variations are taken care of by varying the amount of heat applied to the mesh. This is effected by means of a switch which can be turned to any one of six positions. The amount of energy applied to the screen depends on the resistance of the mesh and the moisture content of the material but is generally about 11 kW. p.s.f. of area. The system can be applied to single, double or triple deck screens, and to any or all decks, but naturally it finds its greatest usefulness with the finer meshes.

The installation of a heated mesh resulted in one instance in a saving of approximately £750 a year on a single screen. It became unnecessary to employ an operator for scraping to prevent "blinding" and mesh life was extended from a few weeks to six months. In addition to this large saving the customer is getting a 25 per cent increase of throughput and a more consistent sizing of his product. Due to the now constant mesh aperture, screening efficiency has increased from 60 per cent to over 90 per cent.

As we go to press, yet another order has been placed by Williamsons Diamond Mines for a 13B and a 10B Pegson gyratory crusher, a tribute to the great reliability of Pegson machines in this remote area.

MACHINERY AND EQUIPMENT

Transformers for Overseas Duty

Manufacture of the larger sizes of high voltage transformers has been increased recently by Brush Electrical Engineering Co. Ltd., made easier by the introduction of a new technique for drying and processing the transformers which better fits them for service than is possible with traditional methods. In this technique, the transformer core and coils are placed in a circulating air oven and dried with air which has been dehydrated with activated alumina, subsequent impregnation is with de-gassed oil to remove the air from the windings.

Two orders completed and shipped in December, 1954, are examples of the type of work now being undertaken in greater volume. The first was from the Electricity Supply Commission of New South Wales for two 27.5 MVA high voltage transformers for Wagga substation, manufactured to Australian Specification C61. Each was a 3-phase, 50 cycles, 3 winding, forced oil circulation, air blast cooled transformer with a voltage ratio of 132/66/11 kV.

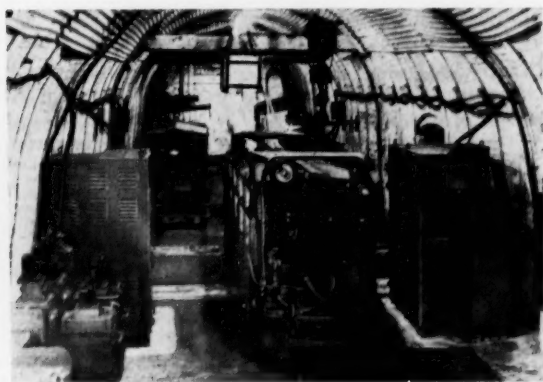
The second order, completed in December, was for two 10 MVA high voltage transformers for the Aluminum Company of Canada at Quebec. The interesting feature of the design is that in these 1954 kV transformers the windings on the centre phase are reversed on the limb with respect to the windings of the other two phases.

The company has also received an order for electric motors, totalling 4,800 h.p., from Vaal Reefs Exploration and Mining Co. Ltd., South Africa. The motors are of the high torque, squirrel cage, induction type, in 27 sizes ranging from 60 to 250 h.p. They will be used for gold mining, driving crushers, and similar works. The order was placed through Brush Aboc (Southern Africa) Ltd., the Brush Group's subsidiary company in Johannesburg.

Rectifiers for Mining Service

The rectifiers for mining service manufactured by Hackbridge and Hewittic Electric Company Ltd., are in use in many of the world's mining fields. More specifically, the company's units are installed in 47 different countries, the total capacity of these installations being 1,500,000 Kw.

Hewittic rectifiers fulfil two important functions. Firstly they can be used to supply D.C. driven mining and processing plant, and secondly the electric locomotives on the haulage system. The equipment can provide the traction supply both in mines that are non-flammable and those where danger from gases exists. In gas-free mines where the locomotives are supplied through a standard trolley wire system, the rectifiers can be easily installed in convenient sites to achieve the most satisfactory arrangement. In mines where flameproof battery driven locomotives are essential, Hewittic battery charging units provide a simple and efficient means of recharging the batteries.



Hewittic chargers for locomotive batteries in a British coal mine



A Hewittic rectifier substation in mining traction service in the United States

The rectifier equipment comprises an A.C. switch, transformer, rectifier and D.C. switchgear.

The rectifier transformer can be manufactured either for air or oil cooling according to capacity, and the nature of the site. Where air cooling is required, this may be natural air cooling or alternatively, by means of a fan cooled air-to-air heat exchanger through which the air within the transformer case is circulated by a second fan and directed constantly, by means of baffles, through the core and windings.

The rectifiers manufactured by the company are designed on a basis of individual units, any number of which can be arranged to comprise a compact bank of given capacity. Each unit is completely self-contained and employs one, two or four bulbs according to the capacity and layout of equipment required. The units are constructed in two main sections.

All the auxiliary components are housed in a sheeted angle-iron base which forms a compact sub-unit, whilst the bulbs (in the case of a 4-bulb unit) are grouped in two sheeted cradles which slide into suitable tracks on the base and provide the necessary enclosure for the efficient cooling and protection of the bulbs.

The method of grouping four heavy duty three-arm bulbs with single fan cooling has for many years been an advantageous feature of the larger capacity Hewittic rectifier unit. This arrangement affords each unit a maximum output for a minimum of occupied floor space whilst remaining comparatively light and requiring no special foundations or overhead crane facilities.

The flexibility of Hewittic unit construction enables the location of substations at strategic positions in the mine, and it affords an additional advantage for future operation when the centre of load changes, it being a simple matter to dismantle a complete equipment for transfer to a new site.

Hewittic rectifiers are completely automatic in operation and require no maintenance except the occasional lubrication of the fan. The rectifier bulbs are made of special heat-resisting glass which is mechanically tough and free from deterioration in use, even over long periods.

In mines where a trolley wire cannot conveniently be used or where a flameproof locomotive is necessary, a battery charging rectifier and battery locomotive provide an excellent solution. The company's glass bulb battery chargers are specially designed so that variation in current during normal charging is entirely automatic and the correct charging rate assured.

By means of a switch, provision is also made for giving the battery a periodical low-rate equalizing charge, whereby individual cells which have not attained the fully charged state in the course of routine charging may be topped up to a state of full charge without overcharging the remaining cells.

The desired reduction of current, during normal charging, may be obtained automatically by natural taper as the battery voltage rises, the tapering of the charge being predetermined by the designed impedance characteristics of the charger circuit. Alternatively, charging may be commenced at the maximum rate recommended for the battery and the necessary reduction in current obtained automatically by arranging a control relay to switch in additional impedance when the charge has progressed to a predetermined point.

Flexible Ventilation Tubing

Manufactured from first-quality fabric, closely woven to withstand the pressure of air and abnormal wear and tear and with both sides of the fabric heavily coated with fire-resistant and non-static P.V.C. compound to enhance the original properties of the fabric and also to safeguard against rotting, the Leonex flexible ventilation tubing manufactured by Rubber Improvement Ltd. has obvious advantages for underground service.

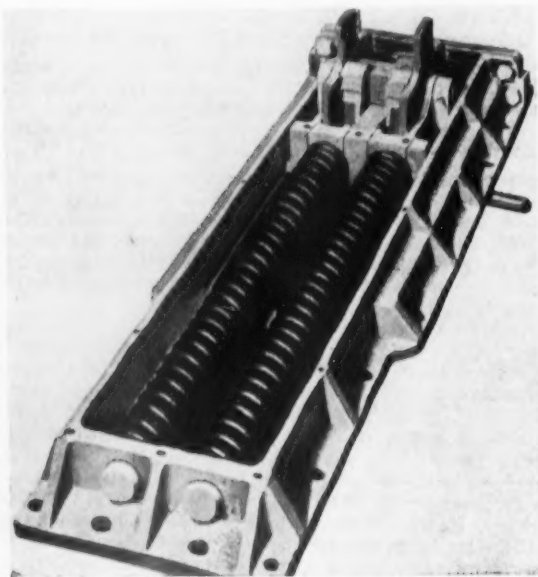
The tubing is supplied in sections of 25, 50 or 100 ft. lengths and in diameters of 12 in., 16 in., 18 in., 20 in. Coupling of lengths together is a simple operation requiring no tools or equipment, as spring rings built into the ends of each length merely require pushing one inside the other to make a safe connection.

To reduce resistance in the initial inflation of the tube, and also to ensure free ventilation when the blower-type fan is stationary, lateral struts have been fixed at 2 ft. intervals along the inside of the tube. By use of these struts there is only partial collapse into an oval shape should a fan fail. Under these conditions a ventilation tube of the conventional type would totally collapse. The tubing was initially designed for use in conjunction with the blower-type fan in the mining industry, where temporary methods of ventilation are vital factors in development work. Features of the tube are its extreme flexibility, speed of erection, and ease of handling.

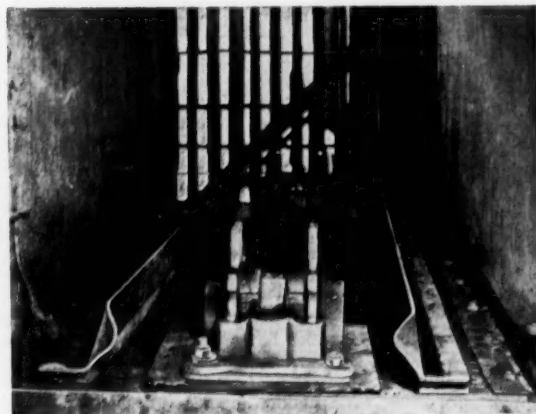
Spring-Loaded Tub Controllers

Some years ago the necessity arose for an automatic device for use in the mining industry which would pass a specified number of tubs over a given point, thus enabling a greater degree of handling efficiency and eliminating manual labour to a large extent. This led to the introduction of what is now popularly known as the McBean and Eaton Tub Controller. At the time of innovation of the controller, the payload of tubs was considerably less than to-day's average, ranging from only 4 cwt. to a maximum of 12 cwt. The machine was, therefore, only a type of stop, enabling tubs to be held on any incline and on release of the catches would count the number of tubs which it had been designed to pass.

The principle of the machine is that of revolving star wheels, the arms of which engage with the axles of tubs. The star wheels are prevented from spinning freely by flat pieces of spring steel, suitably positioned to operate on the square boss connecting the two star wheels. Cams, which form an integral part of each star wheel, rest on balance weighted catch-levers in the locked position. On release by hand or foot operation the



The Tub Controller incorporated in spring buffer frame



The Tub Controller in application to cages

weight of the tubs is sufficient to turn the star wheels against the flat spring and so count the number of axles. The catch-levers return to the locking position immediately after release by the operator, who, having operated the catch-levers, has no further responsibility in connection with the machines working and is at liberty to undertake other tasks.

Apart from the usual points at which this controller is used, the shaft bottom, pit top, or loading stations, it has found extensive application in cages. Whilst retaining tubs in position during winding there is the added advantage of enabling them to be passed in or out on either side of the cage deck. In recent years, however, mining methods have changed and larger tubs and mine cars with capacities of anything from 15 cwt. to 6 or 7 tons are in everyday use.

The tub controller has been adapted by Hadfields Ltd. of Sheffield to meet this increased weight, the original machine being incorporated in a frame fitted with spring buffers which absorb the shock of impact arising from the use of bigger tubs and mine cars. Its application is varied, for it may be used at the shaft bottom to control the flow of tubs into the cage, or likewise at the shaft top, and at the approach to creepers and tipplers its services are invaluable. A version of the machine designed to pass 1 axle is useful at conveyor loading points where it is possible to fill the larger tubs and mine cars evenly. The first half is filled and the controller then operated to bring the rear portion under the flow of coal, thus utilizing the full capacity of the tub. Controllers have been manufactured to pass one, two, three, four or six tubs at a time, as well as the 1 axle mentioned. Most mine cars are fitted with dummy axles to protect the roller bearings and the controllers operate on these.

A rigid type of controller has been evolved to allow for the working of hydraulic rams, and the passage of pipes, etc. This machine is designed in two halves following the principles described.

A New Company Magazine

Issued to promote interest in mine mechanization, *Strata*, a new company magazine published by Joy-Sullivan Ltd., makes its first appearance this month. The new publication will be issued quarterly to companies engaged in colliery and quarry engineering throughout the world. Joy-Sullivan Ltd. is the British subsidiary of the Joy Manufacturing Company of America, pioneers in mine and quarry mechanization.

In this issue Professor G. Hibberd has contributed an article on "Mechanization through the Ages" in which he traces the development of coalcutting machinery from its early primitive days to the present time. The article also contains some thoughts on the future. News about the company's overseas activities is included in the issue, and a photo-feature of the works at Greenock occupies two pages. Other features are "The Story of the Gloster Getter"—the machine manufactured by Joy-Sullivan Ltd.—and the 58-BH Rotary Drill—one of the parent company's products. This is a well produced and effective publication.

METALS, MINERALS AND ALLOYS

COPPER.—Pressure from various trade quarters continues to be directed at Washington with a view to obtaining the diversion into industrial channels of copper destined for the stockpile. Various estimates of the likely shortage of deliveries during February and March seem to point to a total for the two month period of around 30,000 s.tons. On the other hand, it is not thought that more than 14,000 or 15,000 s.tons would be available from stockpile diversions, so that in any event a pretty tight situation looks like developing in March unless, of course, copper already delivered to the stockpile were to be released. There appears, however, to be no suggestion of this at present. Meanwhile, it is reported by the B.D.S.A. that the "set aside" of copper for military and atomic contractors in the second quarter of the year will be 54,000 s.tons, a reduction of 9,000 s.tons on the January to March period. It is stressed that this allocation has been made without reference to the present tight position of copper.

News that makes significant reading at the present time is that net imports of copper into the U.S. last year only amounted to 365,699 s.tons against 559,271 s.tons in 1953.

An interesting commentary on the efficacy of the London Metal Exchange as a pricing mechanism can be observed in the fact that the recent sharp rise in prices has brought out sufficient copper (much of it, of course, secondary) to relieve very largely the shortage which threatened here and on the Continent. This has occurred despite the Copperbelt strike and it is now virtually true to say that the only area of the world which is facing a serious copper shortage is the States. This is not to suggest that the current level of London prices is doing anything but harm to the future development of copper usage, but the fact remains that it has again been conclusively proved that the L.M.E. can and will (if allowed to function freely) establish the price at which supply and demand can be equated.

On the Copperbelt the strike situation appears to be deteriorating in the sense that a settlement is seemingly no nearer than a week ago. The longer the issues are left unresolved the more painful will the subsequent readjustments prove to be. The fact that the companies are now having to resort to all legitimate means of strike breaking, is inevitably storing up some awkward problems for settlement once negotiations with the African union can be effectively resumed. When this point is reached, "no victimization" is in practice bound to be a condition for final settlement which the companies are going to have difficulty in rejecting despite the threatening statements they have been putting out in an endeavour to get the men back to work. Aside from the necessity of finding a face saving formula for all concerned, there is likely, if the strike goes on much longer, to be a very real difficulty regarding the future employment of natives who have been newly engaged since the beginning of the strike, especially as those who have so far been re-engaged since dismissal also appear mainly to have been non-union men.

One aspect of this unfortunate business on which speculation is inevitable concerns the efficiency of the territorial Government's conciliation machinery. It may well be that in the present instance the official conscience is entirely clear. At the same time, we have for so long been hearing it reiterated both from the companies and from the Government that negotiations on African advancement and other labour issues are essentially the concern of the companies and the unions that one cannot help wondering whether, in consequence, the normal processes of industrial conciliation, as understood in this country, have become devitalized.

If nothing else, the strike on the Copperbelt should provide some opportunity for building up coal stocks, which were recently reported to have reached 80,000 tons, probably a record. January deliveries to the Copperbelt amounted to 81,000 tons against a normal monthly requirement of 92,000 tons. It would appear from this that there has been a marked improvement in deliveries of late and, indeed, other reports indicated that the coal position throughout the Federation is now looking healthier. It may well be that so far as the

Copperbelt is concerned the time has, for the moment, passed when much copper production is actually being lost through shortage of fuel, although there is, of course, still quite a bit of high cost fuel (either coal imported from the States, or wood) which can be replaced by Wankie coal as greater tonnages become available.

The Israeli Ministry of Development and Israel Mining Industries Ltd. are to begin preparations for the establishment of a copper plant at Timna in the Southern Negev. Proved reserves are said to be 12,000,000 tons of ore which would yield 180,000 tons of copper.

LEAD AND ZINC.—The U.S. market for lead and zinc has only been moderate this past week. Of particular note has been the tightening in scrap lead supplies which has resulted in a reduction of the smelting fee charged by buyers of battery plates, in some cases to below \$50 per ton, as against \$60 a week or two previously.

Further information is now available from A.B.M.S. sources regarding 1954 lead and zinc imports into the U.S. to which some general reference was made here last week. Overall, imports of both lead and zinc were down last year by about 20 per cent over 1953. In the case of lead, imports of ore were virtually unchanged at 161,517 s.tons, although imports of refined lead was sharply down at 276,282 s.tons compared with 385,071 s.tons.

Total imports of zinc were down at 605,520 s.tons against 748,000 s.tons, reflecting a decrease both in ore and slab zinc.

TIN.—As foreshadowed here last week, a Spanish Foreign Office spokesman has confirmed that his Government is likely to ratify the I.T.A., at the latest within the next two or three weeks.

Figures from official Washington sources disclose an 11 per cent drop last year in U.S. tin imports (metal and in ore) at 87,525 tons compared with 110,508 tons. Principal declines were from Bolivia (6,000 tons down); Congo (3,343 tons down); Thailand (3,628 tons down); Holland (3,076 tons down); and the U.K. (3,457 tons down).

ALUMINIUM.—After declining rather sharply last year the indications are that Canadian exports of refined aluminium to the States during 1955 will be around 225,000 s.tons while deliveries in 1956 are expected to be substantially in advance of the previous record of 237,000 s.tons achieved in 1953. In addition to this, U.S. domestic production continues to go ahead and in January was 128,250 s.tons (700 tons up on December and 10 per cent up on January a year ago).

Alcoa is planning to enlarge the capacity of its Texas smelters at Rockdale and Point Comfort by a further 65,000 tons scheduled to come into production next year. At present each plant has a capacity of around 90,000 tons. Of the increased capacity, 45,000 is scheduled for Rockdale and 20,000 for Point Comfort.

As foreshadowed here a fortnight ago, it is reported that production has now commenced at Australia's first aluminium plant at Bell Bay, Northern Tasmania. Initially, the plant will only produce alumina but when fully operative, 10,000 tons of ingot metal a year is scheduled. At present the plant is running on Malayan bauxite, but eventually it is hoped to rely on domestic ore which, however, suffers from being of low grade.

MANGANESE.—A five-year extension of the U.S. domestic manganese purchasing programme to end-June, 1963, involving Government purchases of 105,000,000 l.t.u. is called for in a Bill presented to the House of Representatives. The Bill also provides for five buying depots instead of the three at present in existence and it would enable 15,000,000 units to be allocated to each of the five depots, while a reserve of 30,000,000 units would be allocated at the appropriate time to additional depots as sufficient suitable ore became available.

It is believed that solid backing will be forthcoming for this programme.

TITANIUM.—Although Japan's titanium production remains small, the industry recorded a large increase in 1954 at 610 tonnes against 70 in 1953. 429 tonnes were exported, of which 230 went to the States and 199 to the U.K. The industry hopes soon to be producing at the rate of 200 tonnes a month.

GOLD.—U.S. production of gold during 1954 showed a decline of six per cent at 1,831,741 f.oz. South Dakota, Utah, and California were again the three main producing States with 535,000 f.oz., 407,000 f.oz., and 235,000 f.oz. respectively. The principal factor in the year's decrease in output was a 16 per cent fall in Utah.

SILVER.—The U.S. Bureau of Mines reports mine output last year as slightly below the figures for 1953 at 36,582,288 oz. (a decrease of about 130,000 oz.). Total production of refined silver in the States last year from domestic and foreign ores is estimated by the A.B.M.S. at 77,481,000 oz., compared with 72,461,000 oz. the previous year.

PLATINUM.—The U.S. platinum market eased fractionally last week and is now quoted at \$75½/\$80 per oz. Industrial demand is reported to be well sustained, and it appears to be the slackening in demand from the jewellery trade and small industrial producers which has brought about the slight reaction.

The London Metal Market

(From Our Metal Exchange Correspondent)

The tin market has not attracted any interest during the last week, and it is expected that this state of affairs will continue until the introduction of the International Tin Agreement becomes certain and more light is thrown upon the American buying policy and the future of the Texas smelter. On Thursday morning the Eastern price was equivalent to £728 per ton c.i.f. Europe.

The lead and zinc markets have both been very thin, most of the activity being due to adjustments in technical positions rather than to outside influences. In both cases, however, it must always be borne in mind that the American stockpile is absorbing regular monthly tonnages and that the overall stock positions are thereby benefiting.

The copper market has once more given the lead to general sentiment, and prices were inclined to sag at the beginning of the week which was probably due to the weakness on the London Stock Exchange and to holidays on the Continent and in America. Turnovers were inclined to diminish on the fall, and it was, therefore, not surprising to see a very quick recovery on Wednesday. Consumer demand, however, has not been brisk, and it remains to be seen whether the maintenance of a level or firm market will bring in buyers once more. There still seems to be some shortage of physical metal for delivery during March and April, but it is no longer expected that this will cause any serious price movement as the high price of copper in the U.K. has attracted tonnages of metal to this country which should begin to arrive before consumer stocks are completely exhausted. The American market has been quiet, and it is expected that sufficient Government assistance will be forthcoming to prevent any real hardship to consumers resulting from the diversion of copper to the European market.

Closing prices and turnovers are given in the following table:—

	February 17		February 24	
	Buyers	Sellers	Buyers	Sellers
Tin				
Cash	£707	£708	£707½	£708
Three months	£711	£712	£712	£713
Settlement	£708		£708	
Week's turnover	790 tons		670 tons	
Lead				
Current half month	£102½	£103	£103	£103½
Three months	£102½	£102½	£102½	£102½
Week's turnover	2,425 tons		3,500 tons	
Zinc				
Current half month	£89½	£89½	£88	£88½
Three months	£87½	£87½	£86½	£87
Week's turnover	5,300 tons		3,675 tons	
Copper				
Cash	£338	£339	£339	£339½
Three months	£324	£325	£327	£327½
Settlement	£339		£339½	
Week's turnover	9,700 tons		5,600 tons	

OTHER LONDON PRICES — FEBRUARY 24

ANTIMONY

English (99%) delivered,	
10 cwt. and over	£210 per ton
Crude (70%)	£200 per ton
Ore (60% basis)	22s./24s. nom. per unit, c.i.f.

NICKEL

99.5% (home trade)	£519 per ton
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OTHER METALS

Aluminium, 99.5%, £163 per ton	Osmium, £35 oz. nom.
Bismuth	Palladium, £6 15s. oz.
(min. 2 cwt. lots) 16s. lb.	Platinum, £27/£27 15s.
Cadmium (Empire), nominal	Rhodium, £41
Chromium, 6s. 5d./7s. lb.	Ruthenium, £16 oz.
Cobalt, 21s. lb.	Quicksilver, £109-£110
Gold, 251s. 8d. f.o.z.	ex-warehouse
Iridium, £32 oz. nom.	Selenium, 43s. nom.
Magnesium, 2s. 4d. lb.	per lb.
Manganese Metal (96%-98%)	Silver, 74½d. f.o.z. spot and
£225/£262	74d. fd
Osmiridium, £40 oz. nom.	Tellurium, 15s./16s. lb.

ORES, ALLOYS, ETC

Bismuth	40% 6s. 3d. lb. c.i.f.
	30% 5s. lb. c.i.f.
Chrome Ore—	
Rhodesian Metallurgical (semi-friable) 48%	£12 12s. 6d. per ton c.i.f.
Refractory 45%	£12 5s. 0d. per ton c.i.f.
Smalls 42%	£8 17s. 6d. per ton c.i.f.
Baluchistan Metallurgical	£13 5s. per ton c.i.f.
Magnesite, ground calcined	£26-£27 d/d
Magnesite, Raw	£10-£11 d/d
Molybdenite (85% basis)	105s. 3d.-108s. 1d. per unit c.i.f.
Wolfram and Scheelite (65%)	260s./265s.
Tungsten Metal Powder (98% Min. W.)	20s. 7d. nom. per lb. (home)
Ferro-tungsten	17s. 7d. nom. per lb. (home)
Carbide, 4-cwt. lots	£37 6s. 3d. d/d per ton
Ferro-manganese, home	£54 15s. 0d. per ton
Manganese Ore Indian c.i.f.	
Europe (46%-48%)	66d./68d. per unit nom.
Brass Wire	3s. 1½d. per lb. basis
Brass Tubes, solid drawn	2s. 6½d. per lb. basis

U.K. METAL AND MINERAL IMPORTS IN 1954

	Units	December 1954	Jan.-Dec. 1953	Jan.-Dec. 1954	Increase or decrease in 1954 over 1953
Non-ferrous Metals and manufactures:					
Aluminium and alloys	Cwt.	409,894	3,584,996	3,825,961	+ 240,965
Bismuth	Lb.	35,658	533,459	688,683	+ 155,224
Cadmium	"	144,425	939,993	1,635,710	+ 695,717
Cobalt and Alloys	"	584,534	3,491,289	5,720,731	+ 2,229,442
Copper: Electrolytic	Cwt.	522,393	4,415,214	5,006,450	+ 591,236
Other sorts	"	218,959	2,314,018	3,011,527	+ 697,509
Lead and lead alloys	"	438,786	3,582,556	3,950,867	+ 368,311
Mercury	Lb.	158,975	1,621,736	2,240,983	+ 619,297
Nickel	Cwt.	12,634	182,236	176,181	— 6,055
Tin	"	8,582	20,781	48,115	+ 27,334
Zinc and zinc alloys	"	232,872	2,613,879	3,103,514	+ 489,635
Ores and Concentrates:					
Antimony, ore and conc.	Tons	3,080	4,379	3,763	— 616
Bauxite	"	42,815	268,799	370,417	+ 101,618
Chromium ore	"	79,735	160,375	135,030	— 25,345
Iron pyrites	"	56,414	385,133	600,522	+ 440,147
Manganese ore	"	26,946	494,635	502,091	+ 7,456
Molybdenum ore	"	536	3,929	5,974	+ 2,045
Nickel ore, conc. & matte	"	3,190	33,879	32,863	— 1,016
Tin ore and conc.	"	5,669	62,363	58,184	— 4,179
Titanium: Ilmenite	"	16,485	93,857	147,311	+ 53,454
Other sorts	"	180	7,568	7,739	+ 171
Tungsten ore	"	682	4,379	3,763	— 616
Zinc ore and conc.	"	20,466	165,261	192,912	+ 17,651
Non-metalliferous mining products:					
Asbestos	Tons	10,990	111,144	124,461	+ 13,317
Magnetite	"	2,642	22,708	20,678	— 2,030
Sulphur	"	54,662	196,746	375,877	+ 179,131

COMPANY NEWS AND VIEWS

Swiss Loan for O.F.S. Mine Housing

It is announced that an agreement has been concluded in Switzerland whereby a syndicate consisting of the Union Bank of Switzerland, the Credit Suisse and the Swiss Bank Corporation has undertaken to lend 35,000,000 Swiss francs to the Anglo American (O.F.S.) Housing Company. This latter company will in consequence shortly issue in Switzerland 35,000 registered bonds of 1,000 Swiss francs each. The loan which is equivalent at current rates of exchange to about £2,857,000 will bear interest at 4½ per cent per annum. Provision has been made for the redemption of the loan in annual instalments commencing on March 31, 1961, and closing on March 31, 1970. It is intended that these funds should be used towards the repayment of existing temporary loans which were arranged in order to finance the building programme. This is the fourth loan raised in Switzerland by the Anglo American group in the past five years, the total amount of Swiss capital on loan to the group as a result of these operations being about £11,000,000.

Ariston's Lower Costs

Of the several factors which contributed towards a sharp decrease in working costs at Ariston Gold Mines (1929) during the year ended September 30, 1954, the record tonnage of ore crushed was probably the most important. At the same time, a maintenance of recent considerable improvements in working efficiency at the mine had substantial effect. The lower total of development footage accomplished which the exceptionally strong ore reserve position made possible, also served to reduce costs.

Year to	Total	Mining	Tax-	Net	Divi-	Carry
Sep. 30	Revenue	Costs	ation	Profit	dends	Forward
	£	£	£	£	£	£
1954	1,626,194	1,020,144	235,181	170,251*	185,625	78,710
1953	1,541,928	990,956	223,306	145,901†	182,813	44,084

* Excluding transfer of £50,000 from General Reserve

† Excluding adjustments amounting to £24,971

The net result of these technical factors was that a substantial rise in profits took place. These were, however, again insufficient to cover the distribution of 30 per cent on the issued ordinary capital of £1,125,000 in stock units of 2s. 6d. which was maintained at the previous year's level. However, in view of the prospects for the current year such a consideration is of minor importance.

Year to	Tons	Per Ton Ore	Devt.	Ore Reserves*
Sep. 30	Milled	Value	feet	Tons
	(000)	dwt.	(000)	(000)
1954	398.8	7.3	52.11	3.6
1953	346.4	7.4	59.3	4.3

* Available

With the completion of the new Central shaft winder since the end of the financial year, production at the mine should soon reach the planned output rate of 40,000 tons a month. In fact there remains little leeway to make up, for figures in respect of the first four months of the current financial year show that tonnage milled has already risen to 145,200 tons from 123,900 tons in the previous corresponding period. From this tonnage 42,710 oz. of gold were recovered as against 39,488 oz. and profits earned rose to £192,600 from £164,100. Even at the new rate of production the company's ore reserve position is one of considerable strength and represents more than 5½ years ahead of the mill. At the present price of around 6s. 4d. x.d. a satisfactory yield of over 11 per cent can be obtained on the ordinary 2s. 6d. shares. Major General W. W. Richards is chairman. Meeting, March 10, London.

Petaling's Lower Production

The lower output of Petaling Tin during the year ended October 31, 1954, will cause little surprise for only one (No. 6) of the company's three operating dredges worked continuously throughout the year. Of the remaining two dredges, No. 3 resumed production in March after the completion of major structural alterations, while No. 5 which had operated until February was subsequently docked for dismantling and transfer to another area.

Year to	Treated	Per Cu. Yd.	Output	Per Ton Ore
Oct. 31	cu. yd.	Yield	In Tons*	Cost Price
	(000)	(lb.)	(conc.)	£ £
1954	6,836.9	.51	9	1,645 175 422
1953	7,734.1	.53	11	1,847 192 465

* Ore sales 1,645.26 tons (1953—1,847.03)

Dividends on the company's issued ordinary capital of

£513,333 in shares of one Straits \$ (2s. 4d.) each were accordingly reduced to 42½ per cent from the previous level of 70 per cent.

Year to	Mining	Mining	Net	Divi-	To	Carry
Oct. 31	Revenue	Costs	Profit	dends	Reserve*	Forward†
	£	£	£	£	£	£
1954	628,912	256,041	246,097	152,717	28,366	115,369
1953	864,741	353,850	405,939	251,534	NIL	115,961

* Excluding reserve for income tax £59,552 (1953—£124,367)

† After loss on sales of investments £6,054 (1953—NIL)

It may be fairly confidently assumed that the current year will see a considerable improvement over the past year's results. The alterations made to No. 3 dredge to equip it for exceptionally deep working have been successful and it is now operating satisfactorily. Added to this No. 5 is to resume operations in its new area in April, while No. 6 is currently operating in comparatively high grade virgin ground. A point of interest for the future, concerns No. 4 dredge—now on a care and maintenance basis, for as alterations to No. 3 have been so satisfactory, it is the company's intention to modify this dredge also in a similar manner.

Meanwhile during the first quarter of the current financial year a higher output at 440½ tons of tin concentrates has been achieved as compared with 389½ tons in the previous corresponding period. At their present price of around 8s. a 12 per cent return may be obtained on the ordinary 2s. 4d. shares of Petaling. Mr. J. T. Chappel is chairman. Meeting, March 4, Malaya.

Anglo-French Earns More and Pays More

No doubt helped by sharedealing opportunities, profits earned during the year ended December 31, 1954, by the Anglo-French Exploration Company showed a useful rise over those of the previous period.

Year to	Total	Tax-	Net	Divi-	To	Carry
Dec. 31	Profit	ation	Profit*	dend	Reserve	Forward
	£	£	£	£	£	£
1954	86,937	40,245	39,109	38,500	25,000	5,477
1953	82,638	39,841	33,320	33,000	NIL	29,868

* After £7,583 applied in reduction of book value of investments (1953—£9,477)

The distribution on the issued ordinary capital of £800,000 in stock units of £1 was accordingly raised to 8½ per cent from the previous total of 7½ per cent.

Anglo-French has a strong portfolio of quoted shares, mainly mining properties, amongst which many of the promising new Orange Free State properties, not yet at the dividend paying stage, are included. Mr. F. R. Cottell is chairman. Meeting, March 30, London.

C.M.S. to Make 1 for 20 Scrip Issue.—It has been announced that the Consolidated Mines Selection Company proposes to capitalize £45,000 from general reserve for the purpose of making a scrip issue on a basis of one for twenty at present held. After the addition during the past financial year of £95,000 (appropriations £67,090 and appreciation of investments £27,910) this reserve now stands at £345,000.

Meanwhile, preliminary figures for the year ended December 31, 1954, reveal that profit before tax rose to £382,464 from £258,729 previously. After tax of £178,736 (£120,267) and adjustments of £5,809 (£25,236), net profit was £209,537 (£163,689). With the recommendation of a final distribution of 15 per cent, dividends on the issue ordinary capital of £900,000 in units of 10s. have been maintained at 25 per cent—the previous year's level. An amount of £67,090 (£20,787) was placed to reserve and unappropriated profits carried forward were increased by £8,697 (£9,161). Mr. A. C. Wilson is chairman. Meeting, March 29, London.

Lowland Lead Project to Go Ahead.—At an extraordinary general meeting of the Siamese Tin Syndicate this week it was decided that the Lowland Lead Mines project should go ahead. (See *M.J.*, February 11, page 161.) A total of 484,611 proxies were stated to be in favour of the resolution contained in the chairman's letter to shareholders dated February 4, while the total of those proxies against was only 190,766.

Clutha Accepts New Zealand Government's Compensation Offer.—It has been announced that the Clutha River Gold Dredging Company has accepted an offer of £25,000, plus a contribution of £4,000 towards arbitration costs, estimated at £7,000, for the loss of dredging rights over the balance of river claims not already worked. This settlement does not in any way affect the present operations of the dredge on the Earnsclough Areas.

Southern Tronoh's New Areas.—As a result of recent prospecting by Southern Tronoh Tin Dredging Company which has been carried out on rubber estates, two tin-bearing sections which are on adjoining estates have been proved. Options have accordingly been exercised over these sections on what has been described as "satisfactory terms".

The total area selected amounts to 371 acres containing approximately 16,000,000 cu. yd. of ground of an average tin ore content of .42 kati per cu. yd. This will be sufficient to keep one of the company's existing dredges in operation for about seven or eight years after it has exhausted its present area. The ground is shallow and modification of an existing dredge will therefore be needed. This will be carried out when the dredge is in due course dismantled for transfer to the new site which is about 35 miles distant. Despite the knowledge that costs of transfer to, and development of, the new area will be considerable, the company is satisfied that the revenue to be expected will make the area a very useful addition to the properties at present held.

International Nickel Pays 55 Cents.—A quarterly dividend of 55 c. has been announced by the international Nickel Company of Canada on the 14,584,025 common stock of no par value. During the year ended December 31, 1954, a quarterly rate of 50 c. was paid together with an extra dividend of 90 c. in respect of the final quarter. This brought the total distribution up to \$2.90 per common stock as against \$2.35 for 1953. Dr. John F. Thompson is chairman.

Date of Kentan Gold Areas Meeting.—In last week's issue of the *Mining Journal*, page 188, it was stated incorrectly that the meeting of Kentan Gold Areas would be held in London on March 24. This date referred in error to the previous year and should have read April 20.

December Mine Returns

OIL OUTPUT

Company	December (in tons)	Months Since Year End	Cumulative Totals (in tons)	
			This year to date	Last year to date
Anglo Ecuadorian.....	28,725	9	246,178	236,219
Apex Trinidad.....	38,581	3	113,318	111,298
Attock Oil.....	\$46,780	12	182,834	165,471
Kern Oilfields.....	26,564	6	184,602	193,718
Kuwait Oil.....	4,173,223	11	42,716,842	38,620,002
Lobitos Oil.....	42,349	12	498,204	465,189
Trinidad Central.....	8,453	12	105,044	97,287
Trinidad Leaseholds.....	83,362	6	485,143	451,754
Trinidad Petroleum.....	41,555	5	205,106	197,129
Ultramar Oil*.....	115,411	12	1,312,589	1,190,759
Qatar.....	424,219	11	4,274,882	3,654,955

Note.—1 ton taken to equal seven barrels

*Output figures are for S.A.P. Las Mercedes in which Ultramar holds a 50 per cent interest

‡November figures

§December quarter

COAL OUTPUT

Company	December (in tons)	Months Since Year End	Cumulative Totals (in tons)	
			This year to date	Last year to date
Amal. Coll. of S.A.....	577,060	12	6,903,259	7,409,471
Apex.....	88,589	12	973,339	959,225
Blesbok.....	43,252	12	529,724	619,302
Coalbrook.....	33,417	12	133,745	—
Coronation.....	95,701	12	1,050,490	1,068,355
Dundee.....	31,636	12	379,343	438,605
Natal Navigation.....	102,092	6	612,674	697,513
New Clydesdale.....	77,177	6	447,316	435,266
New Largo.....	89,198	12	1,004,796	587,587
S.A. Coal Est.....	141,099	6	818,332	821,369
Springbok.....	73,531	12	831,384	856,941
Transvaal & Delagoa.....	124,896	4	499,184	501,747
Van Dyks Drift.....	51,937	12	618,470	574,476
Vierfontein.....	100,695	12	988,724	345,431
Vryheid Cor.....	45,816	12	508,270	512,783
Vryheid Cor.*.....	36,834	12	425,751	432,541
Wankie Coll.....	285,297	4	1,104,089	824,684
Wankie Coll.*.....	16,368	4	63,548	48,945
Witbank.....	152,924	12	1,618,657	1,623,864

*Coke

TECHNICAL MINING ASSISTANT required by Copper Mining Company in India. Applicant should hold a recognized mining degree and preferably be single. Salary starts at £675 p.a. rising to £725 in the third year with cost-of-living and servant allowances of £141 p.a. In addition, an annual bonus is paid, and a Provident Fund is in operation. Three years' contract, with leave on full pay after 2½ years in India. Free furnished accommodation with fuel and light. Apply, giving full particulars, to Box 540, Walter Skinner Ltd., 20 Copthall Avenue, London, E.C.2.

Mining Men and Matters

Aluminium Progress Exhibition.—On June 1 to June 11, 1955, at the Royal Festival Hall, the aluminium industry is to present a Progress Exhibition. This exhibition has a three-fold purpose, namely, to celebrate the centenary of aluminium as a commercial metal, to show the progress made by aluminium since 1855, and to illustrate the research and development sponsored by the aluminium industry and the Aluminium Development Association, which has been completed in the last decade. The exhibition is primarily directed to all present and potential users of aluminium, and will be divided into sections devoted to the history, research, production, the current uses and future scope of aluminium.

Possible New Venue for Northern Rhodesia Mines Department.—There is every likelihood that the Northern Rhodesia Mines Department will soon be moved from Ndola to Kitwe. The Acting Commissioner of Mines said recently that there are two reasons for such a move. First, Kitwe is more central and if the Department were situated there, the time spent by inspectors travelling to and from the Copperbelt mines would be greatly reduced. Second, a need exists for closer co-operation between the Mines Department and the Silicosis Medical Bureau already established at Kitwe.

The Acting Commissioner said that as far as silicosis research was concerned, Northern Rhodesia's copper mines probably afforded the best opportunity in the world for the investigation and possible elimination of the disease. It is envisaged that the Mines Department will be equipped with a laboratory for dust research. This laboratory would work in close liaison with the Silicosis Medical Bureau.

Consolidated Pneumatic in West Africa. Consolidated Pneumatic Tool Company of 232 Dawes Road, London, S.W.6, have announced that representation for the full range of the company's compressed air products has been arranged with the United Africa Company Limited, of Unilever House, London, E.C.4, with offices in the Gold Coast at Accra, Takoradi and Kumasi, and offices in Nigeria at Kaduna, Lagos and Enugu. Under this arrangement, stocks and spares will be held in these territories and to ensure a complete service, the company has appointed **Mr. P. J. Darnell** as resident technical representative.

Conference on Compressed Air.—The Cornwall section of the Institution of Production Engineers is holding a two-day conference on "Compressed Air as an Aid to Improved Productivity," on April 13 and 14, 1955, at the Cornwall Technical College, Trevenson, near Camborne (by kind permission of the Governors).

Mr. J. Boyd has been appointed vice-president-exploration, of Kennecott Copper Corporation in succession to **Mr. A. Gray**, who recently resigned.

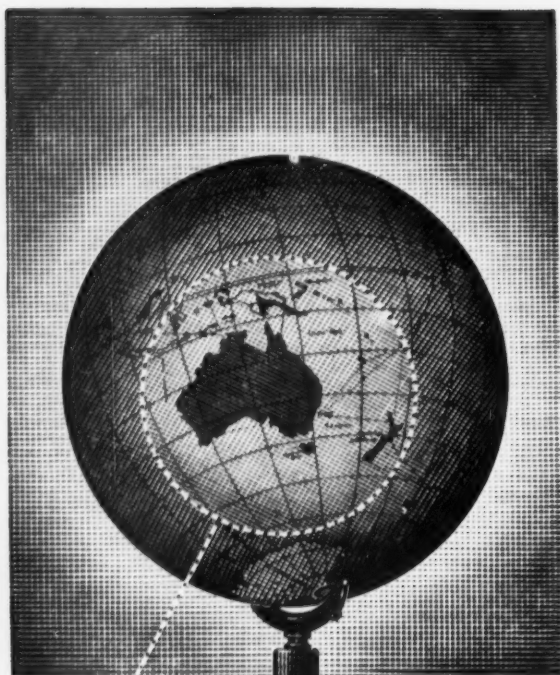
Mr. W. H. A. Lawrence has resigned his seat on the board of General Mining and Finance Corporation, and **Mr. P. H. Anderson** has been appointed to fill the vacancy thus created.

Mr. A. Probert has resigned from the United States Bureau of Mines to accept a position as Vice President and General Manager of the Compania Minera de Guatemala S.A., producers of lead, zinc and silver ores and concentrates. His new address is Box 511, Apartado Postal, Guatemala, C.A.

British Insulated Callender's Cables Ltd. announce that the new address of their London Branch Sales Office is 10/14 White Lion Street, London, N.1. The telephone numbers are TRminus 8696 and 0372. The Company's Central Administrative Offices remain at 21 Bloomsbury Street, London, W.C.1.

Martin, Black and Company (Wire Ropes) Ltd., have opened a stores depot at 640 Woodborough Road, Mapperley, Nottingham. Telephone: Nottingham 47293.

GEOLOGIST required for work in Gold Coast Mines. Applicants should be graduates in Geology preferably with at least two years' Mine or Field experience. Salary dependent on qualifications and experience, but not less than £1,100 per annum for Junior man. Extra allowance for a married man. Free furnished accommodation, medical services and passages. Permanent employment offered. Tours abroad fifteen months, followed by three months' leave on full pay. Write, giving particulars of experience and qualifications, to Box 7643, Whites, 72/78 Fleet Street, London, E.C.4.



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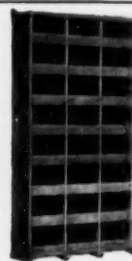
The information you require about the Australian mining industry can be quickly supplied from the normal records of the Australia and New Zealand Bank, or obtained from the Bank's network of branches throughout Australia. A booklet, *Australia's Continuing Development*, is also available on request, covering every side of Australian commercial and economic life. It includes a section on current mineral production, comparative statistics and a map showing the chief centres of mining activity. All enquiries will be welcomed at the Head Office in London.

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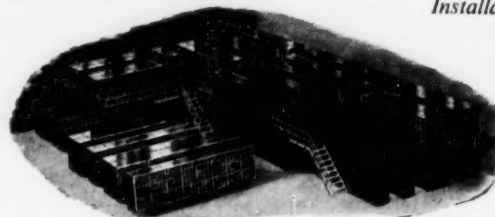
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EFFECT OF FALL IN LEATHER VALUES

MR. GEORGE W. ODEY'S REVIEW OF ACTIVITIES

The 34th ordinary annual general meeting of Barrow Hepburn & Gale Limited will be held on March 18 in London.

The following is an extract from the statement by the Chairman, **Mr. George W. Odey, C.B.E., M.P.** :—

In my Report last year I indicated that if we could secure more favourable conditions in the tanning industry we could look for an improvement on the 1953 figures. During the first half of 1954 the general trading results of the Company did show some improvement on the previous year, but from June onwards our domestic hide market declined steeply.

During 1954 the Government continued its policy of making available a limited allocation of dollars for the purchase of hides in the United States and Canada. The importation of these North American hides, combined with the increased supplies of domestic hides, had the effect of acutely depressing our own domestic hide market, which inevitably tended to destroy confidence in the price of leather.

The fall in inventory values of hides and leather during the second half of the year adversely affected the trading profits for the year and as a result the profits before taxation show a reduction on the previous year, standing at £324,940, as compared with £471,164 for 1953. In spite of this reduction in the trading profit for the year we have been able to show a slight increase in the nett balance available after taxation, which stands at £221,574 as compared with £218,281 for the previous year.

Your Board are anxious to continue their policy of ploughing back a portion of the profits into the Company and have therefore felt it desirable to maintain the Preference and Ordinary dividends unchanged. After deducting the initial allowances we are left with £108,666, which we have been able to add to the Capital Reserve and a small increase in the Carry Forward. That we should have been able to have improved the Capital Reserve in a year when the tanning industry has been passing through such a difficult period is a source of great satisfaction to your Board, particularly having in mind that in a year of heavy inventory losses we have been able to leave the Stock Valuation Reserve virtually unchanged. Needless to say at the lower value of hides and goods in process the Stock Valuation Reserve at £400,000 represents a more than adequate cover.

Our Capital Reserve in the Consolidated Balance Sheet now stands at £650,000. Our Capital and Revenue Reserves, totalling £1,454,868, exceed our issued share Capital.

Our South African interests, The Hodgson Extract Company (Pty.) Ltd. and the Hodgson Estates (Pty.) Ltd., have continued to make an excellent contribution to the profits of the Group.

INTERESTS OTHER THAN TANNING

Our Companies—other than those engaged in the tanning industry—have again done well. Our Mitcham factory, which produces both rubber and leather transmission belting, rubber and plastic conveyor belting, has again made excellent progress. Among the new lines which we are producing in this factory are "Floatex Hard-top" rubber flooring, sponge rubber flanging, cording, channelling and plastic hose. Our export trade, in spite of increasing competition from various foreign countries, expanded considerably as against the previous year, and with our most modern plant we have every confidence of being able to maintain and increase our export trade in the future.

Our department at Grange Mills, where we produce the well-known "Pakawa" travel goods and all types of general leather goods and Government equipment, has fully maintained its position. Our export trade in manufactured leather goods, particularly to the United States, has undoubtedly suffered greatly from the effects of purchase tax.

We are continuing our policy of modernizing our plant and where necessary reconstructing our buildings.

In spite of the fall in leather values during the year the turnover of our Group of Companies as a whole showed a most satisfactory improvement. It has been difficult to gauge the extent to which substitute materials will replace leather for soling materials. The dangers to health—particularly with children—are not always recognized by parents and apart from the question of health in a long-term sense the degree of discomfort with substitute materials varies with the individual.

Your Company is so much involved in the tanning industry that with regard to the future I can only repeat what I said last year—that providing trading conditions in the tanning industry improve the prospects for your Company should be very bright indeed.

JOHN SUMMERS & SONS LIMITED

The annual general meeting of John Summers & Sons Limited will be held on March 17 in London.

The following are extracts from the Statement by the Chairman, **Mr. Richard F. Summers**, circulated with the report and accounts for the 52 weeks ended October 2, 1954:

This business, which was founded by my Grandfather just over one hundred years ago, has had a long history of expansion and progress. Many changes have taken place during the past century. Undoubtedly the most fundamental one was the decision taken in 1937 to abandon the old method of rolling sheets on hand mills and to change over to the continuous rolling method. In 1938 we began the installation of hot and cold mills and a great deal of new finishing equipment. This change-over, which was fortunately virtually completed when war broke out, has ensured the maintenance by the Company of a leading position in the sheet industry of this country.

Since the war there has been a phenomenal increase in the demand for our products, and for a long time we have not been able entirely to satisfy our customers. Many of you, no doubt, will have read from time to time in the Press statements in connection with the expansion which is to take place in the motor industry. Not only the motor industry has plans for expansion; many other of our important and valued customers have also made it clear that their requirements are likely to rise. The higher standard of living brings with it a higher demand for household appliances and labour saving equipment, and the expansion of the oil and drum industries must also be borne in mind. All these markets are very large consumers of sheet steel.

In addition we are naturally under pressure from our many customers in the export market with whom we have had associations extending over a great number of years. Owing to the high home demand, steel sheets are still subject to export licences controlled by the Government. It has always been the tradition of the steel industry to export a fairly large proportion of its products. This applies especially to our section of the trade, and I think it would be a mistake further to reduce the export quota of sheets, which is far below both the present demand and the amount we were exporting before the war.

INCREASE OF STEEL PRODUCTION

It must be remembered that in a basic industry such as steel the raising of production by a substantial amount entails the expenditure of vast sums of money, and the lapse of several years before the plan can be put into operation. Much has been said as to what should be the output of steel in this country, and widely varying totals have been mentioned, but the great progress in production that has been made since the war should not be overlooked. In 1946 the output was 12,700,000 tons; in 1954 it was 18,520,000 tons, and with the present plans in contemplation it is expected that by 1958 it may reach 22,000,000 tons or thereabouts.

The whole question of the shortage of steel sheets is being earnestly considered by the industry, and an endeavour is being made to forecast on a realistic basis the likely requirements in the next few years. So far as we in this Company are concerned we have, as I have already said, for many years occupied a very important place in the steel sheet industry, and I think it can be said that hitherto we have not failed to recognize our responsibilities as members of that industry.

It has always been our desire to endeavour to meet to the best of our ability the demands of our customers, both from the point of view of quantity and quality. We had this very much in mind when we embarked upon the installation of the continuous strip mills in 1937.

POSSIBLE FUTURE DEVELOPMENTS

When our present plans are complete our production of steel will be considerably more than doubled, but it may well be that investigations will show that further expansion of steel sheet production in this country is necessary. If this is the case I would hope and expect that as in the past your Company will play its proper part. You may rest assured that we are fully alive to the position, and are keeping in touch with the appropriate official bodies. In the meantime detailed investigations are being undertaken regarding the possibility of still further expanding the production in our Shotton works beyond the present target of 1,250,000 ingot tons per annum. I am sure you will appreciate that it is too early at this stage for me to make any definite statement on this very important point. However, whatever may be the outcome I feel that we can look forward to the future with confidence.

I hope that when I address you next year I shall be in a position to report further progress, and to inform you that we are operating at a substantially higher level of production.

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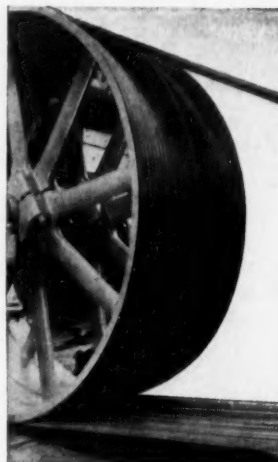
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